



**SECTION - 1
EQUIPMENT DESCRIPTION**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

**2008/2010 MANUAL VERSION 1.0
SINGLE SEAT OPERATOR STATION
WITH A PLUS-1 CRC SYSTEM**

SECTION TITLES

Section 1: Equipment Description

Section 2: Safety & Precautions

Section 3: Preparing the Equipment for Use

Section 4: Operating Instructions

Section 5: (Optional) Tow bar Use and Setup

Section 6: Maintenance

Section 7: Sub-Assemblies & Figures

Section 8: Schematics

Section 9: Parts – List

Section 10: Trouble Shooting

Unit Serial Number: _____

Date of Service: _____

Customer: _____

Hopper ID Number (front): _____

Hopper ID Number (rear): _____

Footage Calibration Number: _____

BearCat Mfg., Inc.
3650 Sabin Brown Road
Wickenburg, AZ 85390
Phone: (928) 684-7851
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This manual describes the Model BC-2002/CRC Tandem Chip Spreader as it is normally delivered to the user. Due to a continuing program of product improvement, changes may be made in equipment delivered at a later date. Every attempt is made to keep users fully informed of such changes.

REPORT OF POSSIBLE DATA ERROR

Mail this form to the address on the title page or FAX to (928) 684-3241

Your Name _____ Company _____

Address _____

State _____ Country _____ Zip _____

Telephone No. _____ FAX _____ Date _____

Manual Title _____

Page No.	Paragraph	Figure No.	Table No.	Problem

BearCat Reply:

Approval:

FOLD

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From: _____

Place Stamp Here

BearCat Mfg.

3650 Sabin Brown Road
Wickenburg, AZ 85390

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WARRANTY AND CLAIM PROCEDURES

LIMITED WARRANTY

BearCat Mfg., Inc. (hereinafter referred to as "BearCat") extends to the original purchaser-user of Model BC-2002/CRC Tandem Chip Spreader, the following warranty covering goods manufactured by BearCat and subject to the following qualifications.

The warranty applies only when the product:

1. Is properly used and maintained in accordance with BearCat instructions, governing agencies or associations.
2. Is being operated under proper fuel and/or cargo specifications.
3. Is not subjected to corrosive or abrasive atmosphere or materials.
4. Has not been damaged through malice or ignorance.
5. Has not been subjected to flood, lightning, accidents, misuse, neglect or unauthorized modification, repair or service.

Parts replaced under this warranty are warranted only through the remaining time of the original warranty.

BearCat warrants that at the time of delivery, the product manufactured by BearCat and delivered new to the original purchaser-user shall be free from defects in material and workmanship for a period of one (1) year after delivery. This warranty is valid when the product is operated and maintained under normal use and service and in accordance with the written instructions provided by BearCat.

Warranty Claims

BearCat agrees at its option, to repair or replace F.O.B. Wickenburg, Arizona, any part acknowledged by BearCat to be defective, provided:

1. The user notifies BearCat of any defect within this warranty no later than thirty (30) days after a defect is discovered.
2. Written or verbal authorization has been obtained from the BearCat Service Department to return the product.

3. Upon authorization, the defective part is returned within 60 days for inspection with transportation charges prepaid to BearCat.

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4. BearCat determines the defective part failed under the terms of the above warranty.

BEARCAT WILL NOT INSTALL AND WILL NOT PAY ANY INSTALLATION COST, TRANSPORTATION COST, TRAVEL TIME, MILEAGE, LABOR COSTS OR OTHER EXPENSES OF ANY DEFECTIVE PARTS REPLACED OR REPAIRED UNLESS THE USER HAS REACHED A PRIOR AGREEMENT WITH BEARCAT.

EXCLUSIONS

The provisions of the foregoing warranty are BearCat's sole obligation and exclude all other warranties, expressed or implied.

BearCat shall not be responsible for any loss, damage, incidental or consequential damages of any kind, whether based upon warranty, contract or negligence, arising concerning the sale, use, or repair of the product.

Components manufactured by any supplier other than BearCat shall bare only the warranty made by the manufacturer of that product.

INTRODUCTION

BearCat Chip Spreaders (Model 2002/CRC) are designed and manufactured to ensure personnel safety when the equipment is operated properly and all safety precautions are strictly followed.

Persons responsible for the operation and field maintenance of the Model 2002/CRC Chip Spreader should read this manual carefully before attempting to operate the equipment or performing any service or adjustment procedures on it.

NOTE: BearCat Manufacturing assumes no liability for accident or injury incurred through improper use of this equipment.

WARNING: BEARCAT CHIP SPREADERS MOVE LARGE AMOUNTS OF ABRASIVE MATERIAL AT HIGH SPEEDS. THIS EQUIPMENT CONTAINS EXPOSED MOVING PARTS AND BELTS. POTENTIALLY LIFE-THREATENING HAZARDS MAY EXIST DURING EQUIPMENT OPERATION. PERSONNEL MUST BE TRAINED AND FAMILIAR WITH SECTION 2 (SAFETY PRECAUTIONS) BEFORE OPERATING BEARCAT EQUIPMENT.

WARNING: POTENTIALLY LIFE-THREATENING HAZARDS MAY EXIST DURING EQUIPMENT OPERATION. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO OPERATE, SERVICE OR MAKE ADJUSTMENTS TO THE BEARCAT EQUIPMENT.

WARNING: FOLLOW THESE PRECAUTIONARY INSTRUCTIONS EXACTLY. DO NOT TAKE SHORTCUTS. DO NOT ASSUME THAT SOMEONE ELSE HAS ACTED ON YOUR BEHALF. IF ANY RULE OR PRECAUTION IS NOT CLEAR TO YOU, SEE YOUR SUPERVISOR BEFORE USING THE MACHINE.

Abbreviation/Definition Table

Abbreviation	Definition
CRC	Computerized rate control
CCW	Counterclockwise
CW	Clockwise
PSY	Pounds per square yard
KgSM	Kilograms per square meter
FPM	Feet per minute
MPM	Meters per minute
PSI	Pounds per square inch

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SECTION 1. DESCRIPTION

Equipment Description

The Model BC SuperChipper Tandem Series Computer Controlled, Self-propelled Chip Spreader is illustrated in Figure 1-1 and Figure 1-2. The following description of the equipment should be read for familiarity with the operating features and capabilities of the Model BC SuperChipper Tandem Series.



Figure 1-1. Model BC SuperChipper Tandem Series, Curb Side

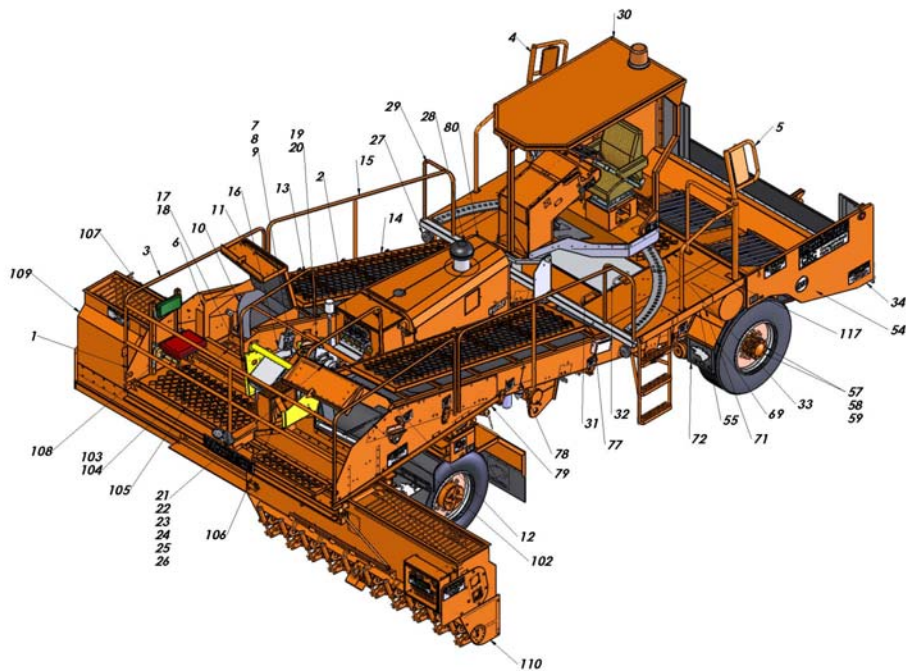


Figure 1-2. Model BC SuperChipper Tandem Series, ISO View

Power Train

Model BC SuperChipper Tandem Series is equipped with a 6-cylinder diesel engine. The engine crankshaft is coupled to an axial-piston, high torque hydrostatic pump, and a hydrostatic transmission and two-speed transfer case which drives a limited-slip front axle.

The particular configuration of the Model BC SuperChipper Tandem Series power train, consisting of front drive (limited-slip), hydrostatic transmission and transfer case, and single hydraulic motor, provides outstanding control and traction far exceeding that previously available. As an example, Model BC SuperChipper Tandem Series is capable of pulling a fully loaded 15 cubic yard dump truck up a 15% grade from a dead stop.

In addition, the hydraulic motor is equipped with a Low-Lock function. With Low-Lock selected, the hydraulic motor is held in full displacement by an electrically actuated solenoid. Low-Lock acts as a speed-limiting device and eliminates any undesired acceleration by the chip spreader on downhill grades.

An optional four-wheel drive system is available for terrain/gradeability situations that require additional traction or control.

Aggregate Delivery System

Model BC SuperChipper Tandem Series employs two hydraulically driven 30-inch wide conveyor belts to move aggregate from the receiving hopper to the spread hoppers. The belts form a 30° -trough angle, which increases the belt load capacity. They are capable of carrying twice the volume of rock while running only 2/3 as fast as a conventional 20-inch flat belt. The belt motion is controlled by solenoid-actuated valves that receive signals from level-sensing diaphragm switches mounted at the top of each spread hopper.

NOTE: Optional belts are rated at 350 °F (for use with hot aggregate).

The conveyor belt return rollers employ a self-cleaning design that prevents any accumulation of asphalt when the machine is used to spread pre-coated aggregate. Other than periodic lubrication of the shaft bearings, as specified in Section 6 of this manual, no maintenance is required for the conveyor belt return rollers.

Spread Hopper

Model BC SuperChipper Tandem Series is equipped with two separate (front [left] and rear [right]) spread hoppers that can be quickly extended from a minimum width of 10 feet to a maximum width of 20 feet. Hopper extension and retraction is controlled from the operator's station or from a remote control box at the top of the right-hand conveyor. By using the computer controlled aggregate gates, the operator can spread material at any width from 1 foot to 20 feet. Figure 1-3 shows the spread hoppers retracted to the minimum width of 10 feet.

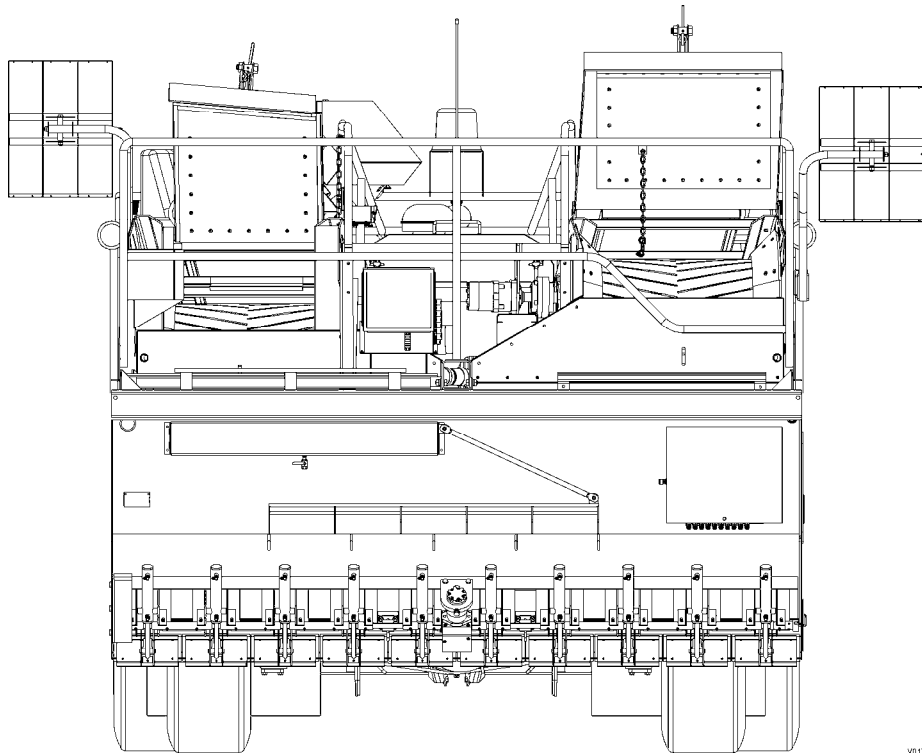


Figure 1-3. Spread Hoppers at Minimum 10-foot Width

Hydraulic power is used to extend the front or rear spread hopper to the desired overall width. Each hopper can be extended or retracted independently for offset and special clearance applications. The hoppers may also be extended or retracted simultaneously for equal width applications. The front hopper extends to the left and the rear hopper extends to the right. Once the maximum spread width is established, the appropriate aggregate gates are selected from the operator's station on the chip spreader. Figure 1-4 shows the spread hoppers extended to their maximum width of 20 feet.

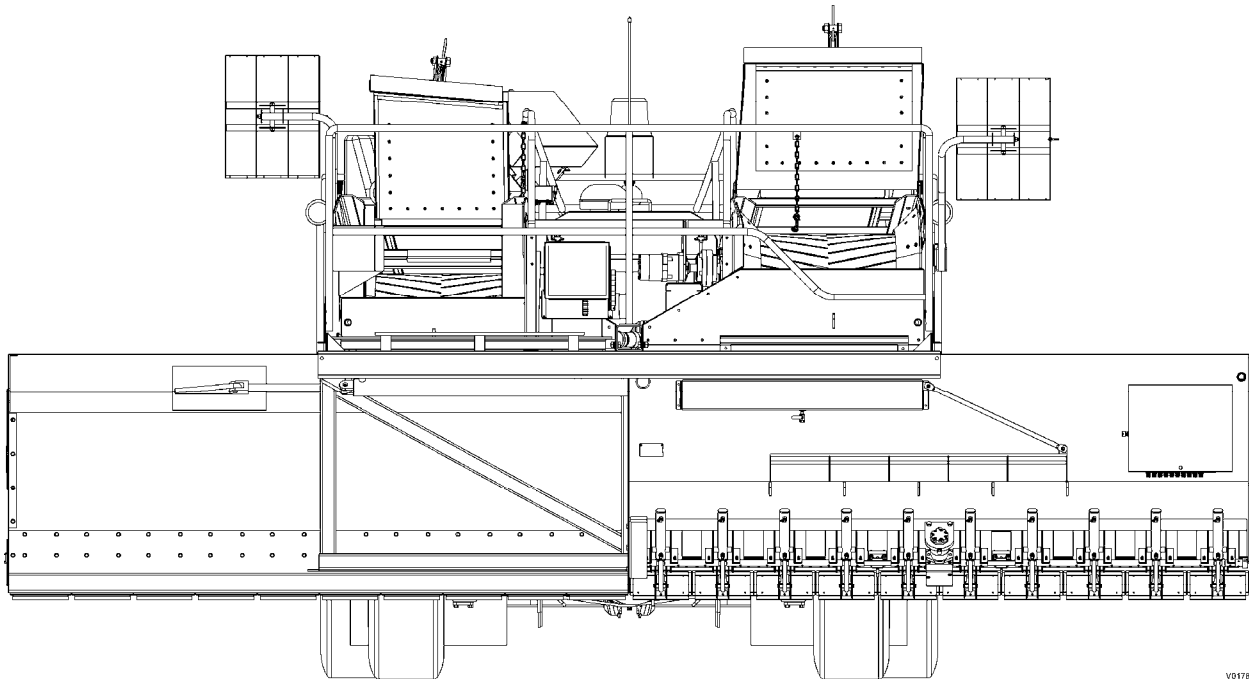


Figure 1-4. Spread Hoppers Extended to 20-foot Width

The operator controls all gates individually from the operator's station. The independently controlled spread hoppers eliminate the need to manually add or remove aggregate gates to accomplish spread width changes. With the hoppers retracted to the 10-foot width, the machine is readily transportable.

Each spread hopper uses a hydraulically driven, 14-inch diameter, abrasion resistant auger to ensure even distribution of the aggregate across the hopper. The 10 aggregate gates on each spread hopper are pneumatically actuated and provide instant response to any computer controlled or manual input. There is no agitator bar or spread roller to wear or limit production.

The spread hoppers have a total capacity of 3.8 cubic yards. The struck capacity of the receiving hopper is 4.5 cubic yards. These capacities allow the Model BC SuperChipper Tandem Series to operate for longer periods than conventional units in situations where the chip spreader cannot be accompanied by a dump truck.

Optional spread hopper extensions are available. The extension adds 12 inches to the outside end of each hopper. This option increases the total spread width capability of the chip spreader to 22 feet.

Gate Control Valve Box

A gate control valve box is mounted on each spread hopper. Each valve box contains the solenoid valves that control the functions of the individual hopper. The solenoid valves can be manually controlled at the box, but are normally controlled from the operator's station. The interior of a valve box is shown in Figure 1-5.

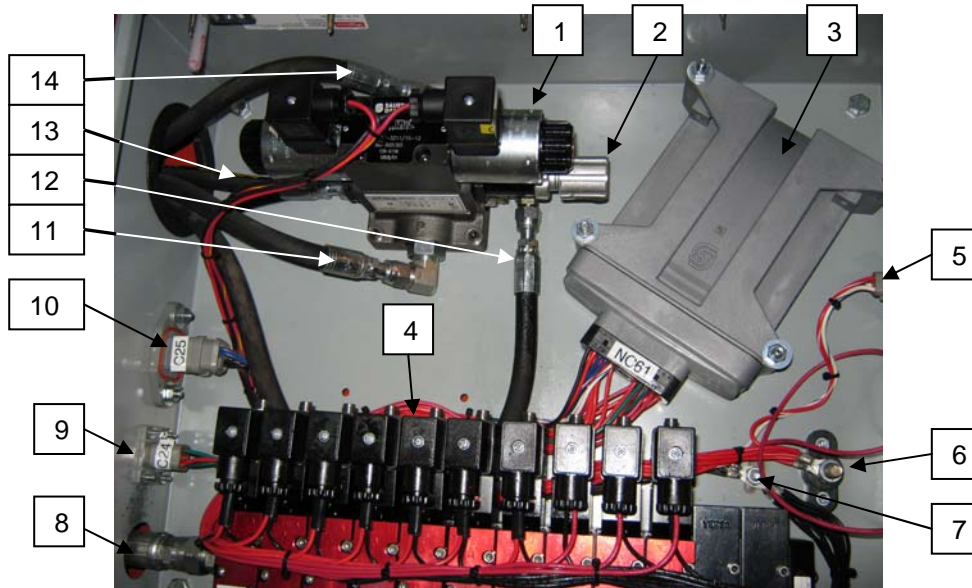


Figure 1-5. Gate Control Valve Box Interior

The functions of the components within the valve box are described in Table 1-1. The numbers in the table refer to the item numbers in Figure 1-5.

Table 1-1. Gate Control Valve Box Functions

No.	Description	Function
1	Hydraulic valve (proportional)	Controls cam open/close position.
2	Cam motor pressure control	Used to set the operating pressure of the cam control valve. Tandem = 1100psi (75bar) Standard = 1600psi (110bar)
3	CAN Network Computer (Chip Box Gate/Cam)	This computer node receives command over a two wire network, of how much to open the cam and which gates should be open. It all reads the actual cam position (% open) and looks at the auger switch. Node 5 is the Left Box (Front Box) Node 6 is the Right Box (Rear Box)
4	Electro-pneumatic valves	Air directional control valves to open or close the gates.



5	Auger Switch	The auger switch input is read by this computer node and then sent to node4 (the slave box) to control the auger motor.
6	12Vdc Power	This 12Vdc is switched on with the ignition switch (acc power)
7	Ground Lug	This lug is welded to the box. NOTE: all air valves are high side switching (ground is connected to the ground lug and the computer node switches the 12v on/off).
8	Air Supply	Air supply for the air valve bank.
9	Cam Sensor	The CAM sensor input is read and used by this computer node to control the CAM open/close position.
10	Power/CAN Connection	This cable comes from the slave box and has the following items: Ground, 12Vdc, CAN + / CAN -
11	Hydraulic Supply	This hose is the supply for the hydraulic control valve. (this pressure is set at the belt pump, = 2300psi)
12	CAM Motor A	CAM motor hydraulic hose A (maximum pressure set by using the pressure control valve mounted under the control valve = Tandem 1100psi, Standard = 1600psi)
13	CAM Motor B	CAM motor hydraulic hose B (maximum pressure set by using the pressure control valve mounted under the control valve = Tandem 1100psi, Standard = 1600psi)
14	Tank	Hydraulic return to tank.

Computerized Rate Control (CRC)

Model BC SuperChipper Tandem Series employs an onboard computer working with appropriate sensors to provide full automatic control of the aggregate flow at all times. Accuracy is assured for sand, rock, or any kind of coated or uncoated aggregate material. The computerized control system performs the following functions:

- Constantly measures the actual rate at which aggregate is being delivered
- Correlates the actual rate with the travel speed of the chip spreader
- Compares the actual flow rate to the rate selected by the operator

The computer then uses the information obtained from these three sources (actual aggregate flow, vehicle speed, and desired aggregate flow rate) to maintain the desired rate at all times. The system automatically adjusts the aggregate flow through the spread hopper gates.

Because the computer constantly monitors the speed of the vehicle, automatic rate control is maintained regardless of speed variations such as those encountered when the chip spreader moves up or down a grade or when accelerating or decelerating. Control is also constant whether the chip spreader is moving forward or backward.

It is important to note that the computerized control system responds instantaneously to changes in vehicle speed or to the selection of a different spread rate by the operator. The actual rate at which aggregate is laid on the surface is always instantly maintained at the selected level required.

Changes in the width of the spread pattern, as for tapered areas, are accomplished by pressing the appropriate switches on the computer control panel. The corresponding gates are instantly closed, and the spread width varies accordingly. The operator does not need to leave his position to make these changes.

Regardless of the spread width selected, or the changes made during a run, the spread rate is automatically maintained at the selected level of aggregate distribution.

Chassis

The chassis members are channel steel, bolted rather than welded, for maximum repairability. The length of the chassis, as shown in Figure 1-6, permits a wheelbase of 158.5 inches. This length, in combination with rubber spring suspension on the front axle, assures smooth, steady control.

The BC SuperChipper Tandem Series is 10 feet wide when the spread hoppers are fully retracted and 20 feet wide when the spread hoppers are fully extended.

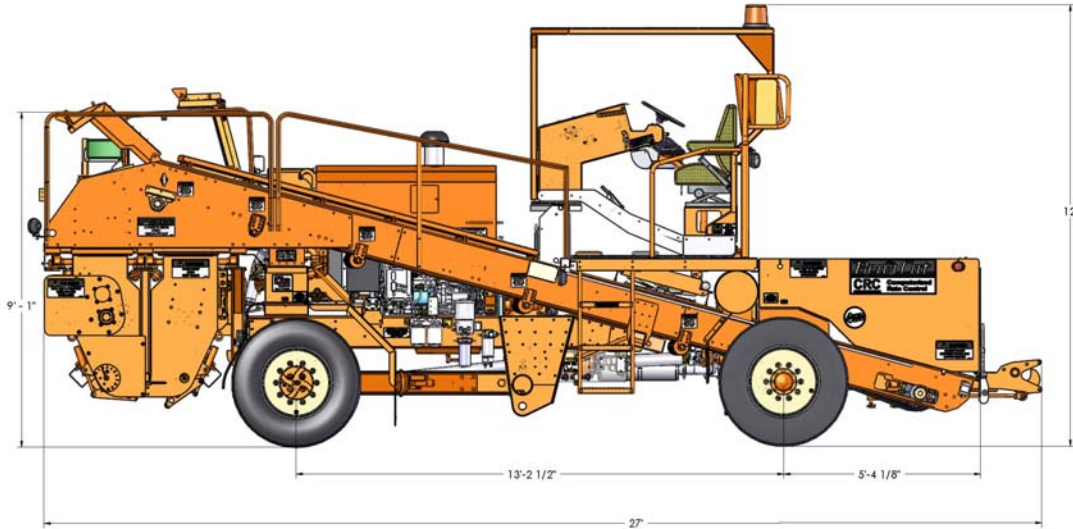


Figure 1-6. Chassis Dimensions

Hydraulically Powered Remote Control Hitch

The hydraulically operated hitch provides positive hooking and unhooking in any of a wide range of relative positions and angles between the chip spreader and the dump truck. The hitch is actuated through a switch on the operator’s control panel.

NOTE: When equipped with the optional hitch lift, hitch height is also adjustable from the operator’s control panel.

BC SuperChipper Tandem Series Specifications

Table 1-2 lists general specifications for the BC SuperChipper Tandem Series.

Table 1-2. Specifications

Hydrostatic Drive System	
Type	Front-wheel drive.

Table 1-2. Specifications

<p>Transmission</p>	<p>Axial piston variable rate high torque hydrostatic pump directly coupled to engine; variable rate hydraulic motor drives axle through 2-speed transfer case.</p> <p>This transmission is controlled using automotive control, (using an electronic foot pedal, as you depress the pedal the engine RPM increases, the node 3 computer is monitoring the engine RPM as it is increasing, the computer will start to stroke the hydrostatic pump causing the chip spread to move, the higher the engine RPM the more the hydrostatic pump is stroked for higher speeds. Once the Hydrostatic pump reach full stroke, the pump controller continues to increase in pressure which than starts to de-stroke the hydrostatic motor for more speed eventually reaching full speed of 1675FPM (510MPM) / 19MPH (30KPH).</p> <p>Also the automotive control has HP / anti-stall control; if the chip spreader encounters is high load and the engine RPM's drop more than 300RPM from what the computer thinks they should be, the computer will start to de-stroke the hydraulic pump so as not to stall the diesel engine, this system allows the chip spreader to operate at 95% plus engine torque. NOTE: the automotive control system is measuring engine RPM off the tachometer signal on the alternator, if you chip spread slows down you may have belt slippage, inspect and replace belt as needed.</p>
<p>Transfer Case</p>	<p>2-Speed, high-low range, air shift, with remote oil cooler</p>
<p>Operating Mode</p>	<p>LOW Range (0-600 FPM) (Low-Lock engaged, 0-300 FPM) HIGH Range (0-1600 FPM) (18 MPH) (Low-Lock engaged, 0-700 FPM)</p> <p>NOTE: In low range the unit will pull a fully loaded 15 cubic yard dump truck up a 15% grade from a dead stop.</p>
<p>Diesel Engine</p>	<p>Cummins QSB 6.7 liter, Tier-3, 275 HP @ 2300 RPM. Inter-cooled turbocharger, with electric start, alternator, dual batteries, dry-type air cleaner and variable speed governor. Emissions compliant</p>
<p>Frame</p>	<p>Main: 10 1/8 in. X 3 1/2 in. channels Cross members: 10 in. X 3 in. channels</p>
<p>Rear Axle</p>	
<p>2-WD</p>	<p>Solid trailer axle (5 in. diameter tube)</p>
<p>4-WD</p>	<p>Rear drive axle. Gear ratio 14.76 to 1 reduction, solid mount</p>
<p>Rating (both)</p>	<p>25,000 lb</p>
<p>Front Axle</p>	
<p>Type</p>	<p>Drive/steering axle with planetary gear hubs, over-all 14.76 to 1 reduction, 42° steering angle; dual rubber spring suspension; 31,800 lb rating</p>

Table 1-2. Specifications

Steering	
Type	Hydraulically powered orbital
Control	Hand wheel; no mechanical linkage
Brakes	
Front	Wet disc, air over hydraulic
Rear (2-WD)	16.5 in. X 7 in. drum S-cam air brake, Anchorlok parking brake
Rear (4-WD)	Wet disc, air over hydraulic
Parking	Spring applied, hyd. released. Fail-safe driveline brake June 2005
Wheels	Disc, front and rear interchangeable
Tires	Truck type, 385/65R X 22.5 highway tread
Positive Lock Hitch	
Type	Hydraulically powered, positive grab and release
Adjustment Range	8 in. to 20 in. height, 6 in. fore and aft
Hydraulic System	
Type	Variable-volume, pressure compensated piston pump
Drive	Engine crankshaft
Configuration	Independent circuits for each conveyor and box function
Reservoir	70-gallon capacity, two 10-micron absolute return filters
Cooling	Hydraulically driven oil cooler with total return flow capacity
Power Steering	Engine-mounted vane pump feeding twin load-sensing closed-center steering valves (excess pump flow powers positive lock hitch)
Receiving Hopper	
Width	10 feet
Struck Capacity	4.5 cubic yards (3.44 cubic meters); includes rubber skirting to prevent spilling
Spread Hopper	
Width	10 feet (each)
Capacity Total	3.8 cubic yards (2.9 cubic meters)
Spread Width	1 to 20 feet, hydraulically actuated
Spread Rate Range	1-160 lbs per-square-yard
Spread Rate Control	Computer controlled CRC system

Table 1-2. Specifications

Cut-Off Gates	Electro-pneumatic powered; 12 inches wide; infinite gate opening adjustment and preset capability from operator's station
Conveyors	
Belt Width	30 in.
Trough Angle	30°
Belt Rating	2-ply
Drive	Independent hydraulic motors
Motion Control	By solenoid valves through spread hopper-mounted level sensors
Conveyors (continued)	
Conveyor Protection	Lined on each side; self-cleaning tail pulleys and return rollers; hooded deflectors at each head pulley
Operator's Station	Left-hand and right-hand adjustable cushioned seats with adjustable suspension; left-hand and right-hand adjustable tilt steering wheels; swing-over control/instrument panel with brake pedal and speed control
Controls and Instruments	
Operator's Panel	Controls - ignition switch, hitch, spread width and rate controls, hydrostatic transmission, parking brake, augers, conveyor belts, transfer case, engine throttle; lockable covers included Instruments - fuel, hydraulic temperature, engine temperature, engine RPM, hour meter, oil pressure, charging system voltage, air pressure
Safety Equipment	Ladders on each side; safety hand rails; electric backup alarm; warning horn, strobe light, turn/flasher/stop lights, and tractor type night work lights
Miscellaneous	
Empty Weight	25,000 lbs
Additional Equipment	80-gallon fuel tank; deck-mounted tool boxes under seats
Over All Dimensions	With spread hoppers retracted and standard tires
Length	27 feet
Width	10 feet
Height	9 feet 3 in.
Ground Clearance	10 in.
Wheel Base	13 feet 2 1/2 in.
Turning Radius	19.5 feet

Table 1-2. Specifications

Front Approach Angle	18°
Rear Approach Angle	20°
Tread	
Front	82 in.
Rear	104 in.
NOTE: As part of a continuing program of product improvement, BearCat Mfg., Inc. reserves the right to make changes in Model BC SuperChipper Tandem Series specifications at any time.	





**SECTION - 2
SAFETY & PRECAUTIONS**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

2008/2010 MANUAL VERSION 1.0

**SINGLE SEAT OPERATOR STATION
WITH A PLUS-1 CRC SYSTEM**

SECTION 2. SAFETY PRECAUTIONS

Personal Safety

Persons responsible for the operation and maintenance of BearCat Chip Spreaders should read the following safety precautions and the remainder of this manual carefully before operating the equipment.

WARNING: ALWAYS REMEMBER THAT CHIP SPREADING MACHINES CAN BE DANGEROUS. THEY CONTAIN EXPOSED MOVING PARTS AND BELTS, AND THEY MOVE LARGE AMOUNTS OF ABRASIVE MATERIAL AT HIGH SPEED. THE HYDRAULIC SYSTEM OPERATES AT HIGH PRESSURE AND THE FLUID AND LINES CAN REACH HIGH TEMPERATURES. YOU MUST HANDLE THIS MACHINE CAREFULLY TO PROTECT YOURSELF FROM PAINFUL OR EVEN FATAL INJURY. HAZARDS ASSOCIATED WITH THIS MACHINE, AND THE NECESSARY PRECAUTIONS TO AVOID DANGER, ARE GIVEN IN THIS MANUAL.

Safety Rules

Read each safety rule and make them a part of your daily work routine.

WARNING: FOLLOW THESE PRECAUTIONARY INSTRUCTIONS EXACTLY. DO NOT TAKE SHORTCUTS. DO NOT ASSUME THAT SOMEONE ELSE HAS ACTED ON YOUR BEHALF. FAILURE TO FOLLOW THESE SAFETY RULES CAN RESULT IN DEATH OR SERIOUS INJURY. IF ANY RULE OR PRECAUTION IS NOT CLEAR TO YOU, SEE YOUR SUPERVISOR BEFORE USING THE MACHINE.

- Keep clear of all moving parts.
- Stay out of the chip box when the diesel engine is running.
- Keep hands away from gates when connecting air hoses.
- Use caution around conveyor belts. They can start automatically.
- Keep clear of rear handrail. Contact with a dump truck tailgate is possible.
- Keep clear of the hitch. You could be injured if it actuates against any part of your body.
- Engage the parking brake and place both the mechanical transmission and the hydrostatic transmission in neutral before leaving the machine.
- Stop the engine before crawling under the machine.
- Keep the surface of the hydraulic oil cooler clear of obstructions.

NOTE: BearCat Manufacturing assumes no liability for accident or injury incurred through improper use of this equipment.

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**SECTION - 3
PREPARING THE EQUIPMENT FOR USE**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

**2008 TO 2010 MANUAL VERSION 1.0
SINGLE SEAT OPERATOR STATION
WITH A PLUS-1 CRC SYSTEM**

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SECTION 3. PREPARING EQUIPMENT FOR USE

This section contains information the operator must know in order to prepare the Model BC SuperChipper Tandem Series Chip Spreader for safe and proper spreading operations.

WARNING: OPERATORS MUST READ AND UNDERSTAND THIS MATERIAL BEFORE ATTEMPTING TO USE THE MACHINE. FAILURE TO FOLLOW THESE OPERATING INSTRUCTIONS MAY RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

CAUTION: THE INITIAL CHECKOUT PROCEDURES GIVEN BELOW ARE MINIMUM REQUIREMENTS. FAILURE TO PERFORM THESE STEPS CAN RESULT IN DAMAGE TO THE EQUIPMENT AND UNSAFE OPERATING CONDITIONS.

Initial Checkout of Machine

1. Make sure all fluid levels are adequate.

NOTE: Use Shell Tellus 100 (HDZ100) or equivalent type ISO100 oil in the hydraulic system. In the brake master cylinder use ISO 46 hydraulic oil.

- A. Hydraulic fluid – the sight glass is located behind the left front fender brace.
- B. Brake master cylinder – located on the left side of the chassis.
- C. Engine oil – the dipstick is located on the left side of the engine.

WARNING: RADIATOR SHOULD BE COOL TO THE TOUCH PRIOR TO REMOVING RADIATOR CAP. ESCAPING STEAM OR HOT LIQUID MAY CAUSE BURNS.

- D. Radiator coolant – check the fluid level at the radiator cap.

2. Check the hydraulic line filters.

NOTE: If the gauge readings exceed 10 inches when the fluid is warm, replace the associated filter element.

3. Visually inspect the tires, hoses, fittings, and belts.
4. Make sure the receiving hopper is filled with the appropriate aggregate for the job.

Operator Control Station Layout

Operators should thoroughly understand the functions of all of the control panel switches as shown in (**Error! Reference source not found. & Error! Reference source not found.**) Details are listed in their corresponding tables.

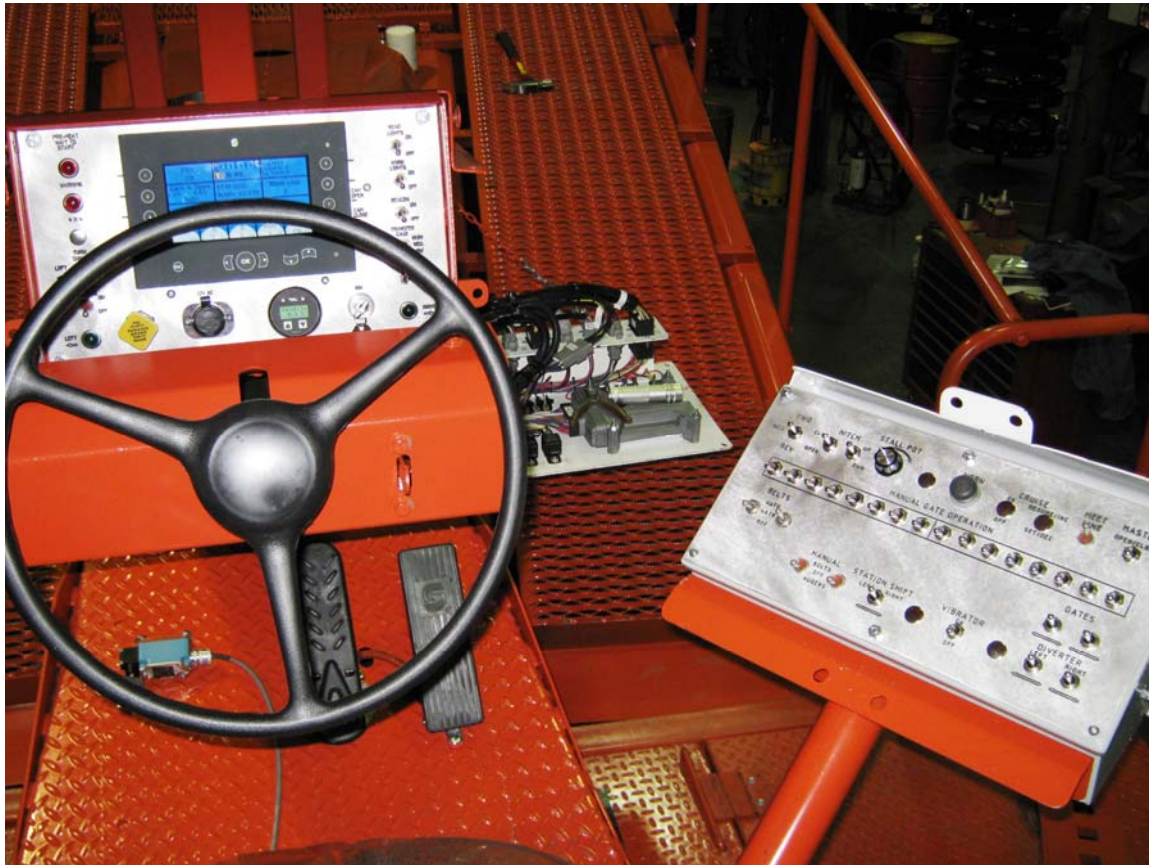


Figure 3-1. Operator control station layout 2008 & up

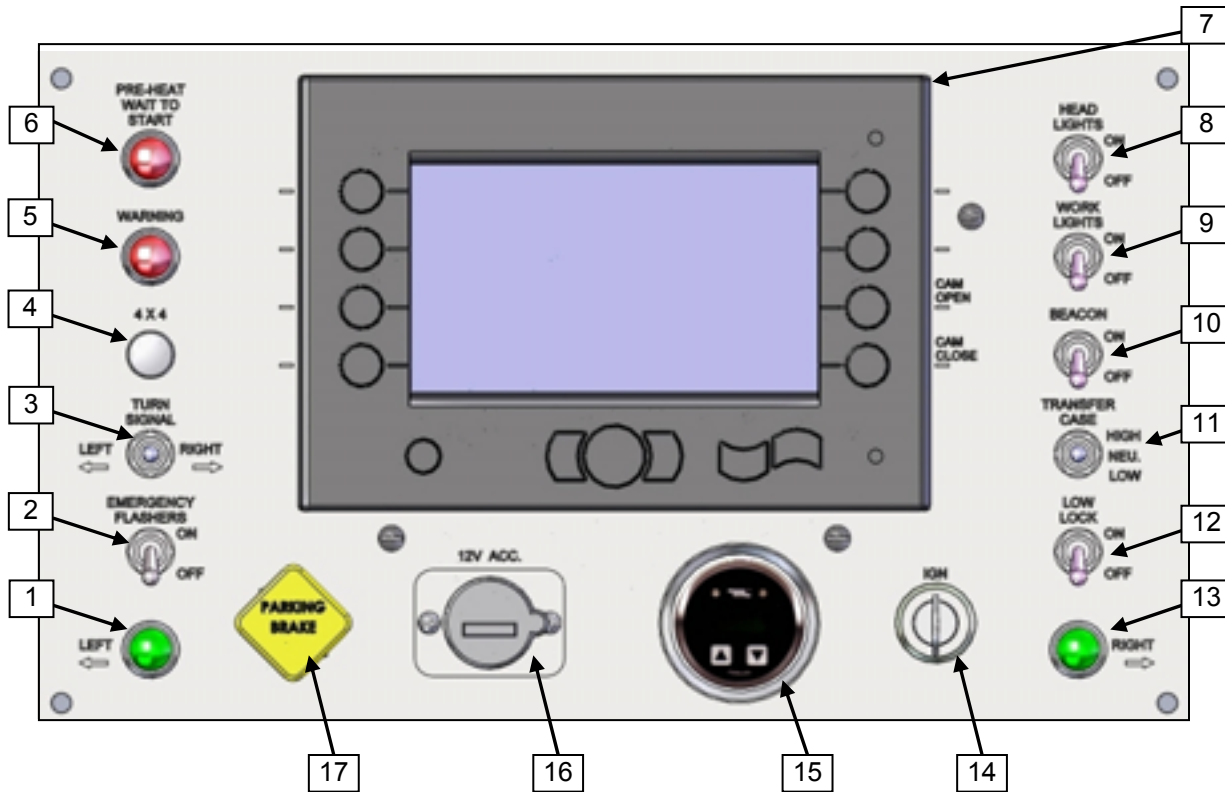


Figure 3-2. Dash panel layout 2008 & up

Table 3-1. Dash panel switches (Error! Reference source not found.)

No.	Switch/Device	Function
1	LEFT LAMP	Left hand directional on indicator.
2	E FLASHER	Turns on emergency flashers so all four directional lights will be flashing.
3	TURN SIGNAL	LEFT: Position enables the left front and rear directional lamps to flash. CENTER: Directional lamps are off. RIGHT: Position enables the right front and rear directional lamps to flash. NOTE: This switch does not turn off automatically.
4	4 X 4	OPTIONAL EQUIPMENT: If equipped with four wheel drive, this switch will engage and dis-engage the rear axle by using a driveline disconnect. WARNING: You cannot use a tow bar with a four wheel drive chip spreader; if you tow a four wheel drive chip spreader faster than 19MPH you WILL DAMAGE the rear drive train.

Table 3-1. Dash panel switches (Error! Reference source not found.)

No.	Switch/Device	Function
5	WARNING	This light indicates that there has been a fault detected by the computer system, if it serious the engine will be shutdown otherwise it is a fault you need to take care of at your earliest convenience. To read about the fault go to the fault page, which will be discussed in Figure 3-?
6	PRE-HEAT	When starting the diesel engine, turn key one position CW & wait until this light is out, than proceed to start engine by turn one position CW.
7	CRC DISPLAY	This computer display, is use to display chip spreader functions, set-up and some engine parameters
8	HEADLIGHTS	ON: Turns headlights, tail lights, and clearance lights on. OFF: Turns lights off.
9	WORK LIGHTS	NO: Turns on any additional working lights, front, side & rear. OFF: Turns work lights off. NOTE: If you install additional work lights DO NOT overload the alternator.
10	BEACON	Turns amber warning beacon on and off.
11	TRANSFER-CASE	HI: In this position the air-operated transfer-case shifter will put the transfer case into high range. NEUTRAL: In this position the air operated transfer-case shifter will put the transfer case in neutral. LOW: In this position the air-operated transfer-case shifter will put the transfer case into low range. NOTE: Normally drive the chip spreader in HIGH range; even while chipping, ONLY USE LOW RANGE WHEN NECESSARY. (It will save wear and tare on the hydrostatic drive system. WARNING: WHEN EVER YOU PARK YOU MUST SET THE PARKING BRAKE!
12	LOW/LOCK	ON: The automotive control system will not de-stroke the motor as far, (max. speed is about 60% ≈ 1050FPM (320MPM) High range / 650FPM (200MPM) Low range. This allows you to run in High range but have a slower more controllable speed range for chipping. OFF: Drive system acts as normal, can reach maximum speeds.
13	RIGHT LAMP	Right hand directional on indicator.
14	IGNITION	Used to control chip spreader engine ignition system.
15	MURPHY GAGE	The Murphy gage is used to display engine parameters and engine fault codes. See Murphy Gage section for more details.
16	ACC. POWER	12Vdc accessory power: This is a standard 12Vdc accessory socket with a maximum 3 amps current draw.

Table 3-1. Dash panel switches (Error! Reference source not found.)

No.	Switch/Device	Function
17	PARK BRAKE	<p>PULL OUT: Releases the air pressure to the brake actuators to apply the spring actuated parking brakes.</p> <p>PUSH IN: Will apply air pressure to the parking brake actuators to release the parking brakes.</p> <p>WARNING: ALWAYS APPLY PARKING BRAKES BEFORE LEAVE OPERATOR SEAT!</p>



Figure 3-3. Control panel switches 2008 & up

Table 3-2. Control Panel Switches for (Error! Reference source not found.)

Switch	Function
FWD-REV.	FWD: The hydrostatic drive system will move the chip spreader forward. NEUTRAL: The hydrostatic drive system will not operation. REV: The hydrostatic drive system will move the chip spreader reverse. NOTE: this switch must be off while starting the engine!
STALL POT	Used to adjust engine RPM when automotive control will start to move the chip spreader. CW: Increases engine RPM before the chip spreader starts to move. CCW: Decreases engine RPM before the chip spreader starts to move. RANGE: Start range approximately 1050RPM to 1550RPM. NOTE: If you do not need full belt speed because you are doing light shot rates, lower your stall start RPM saves fuel and noise.
HOPPER SHIFT	LEFT (Front) (←→): Extends and retracts the left (front) spread hopper only. REAR (←→): Extends and retracts the right (rear) spread hopper only.
HOPPER SHIFT BOTH	OUT (←→): Extends both left (front) and right (rear) spread hoppers simultaneously. IN (←→): Retracts both left (front) and right (rear) spread hoppers simultaneously.
LEFT BELT MANUAL	LEFT BELT MAN: Manually runs the left belt (this is a momentary position switch).
RIGHT BELT MANUAL	RIGHT BELT MAN: Manually runs the right belt (this is a momentary position switch).
LEFT BELT CONTROL	OFF: Belts will not run in AUTO or MASTER Mode. MASTER: Position and when the MASTER SW is selected allows the left belt to run until the spread hopper ultrasonic sensor slows it down and turns it off. AUTO: Position enables the left belt to run until the spread hopper diaphragm switch turns it off.
RIGHT BELT CONTROL	OFF: Belts will not run in AUTO or MASTER Mode. MASTER: Position and when the MASTER SW is selected allows the right belt to run until the spread hopper ultrasonic sensor slows it down and turns it off. AUTO: ON position enables the right belt to run until the spread hopper diaphragm switch turns it off.

Table 3-2. Control Panel Switches for (Error! Reference source not found.)

Switch	Function
L AUGER MANUAL	MAN: Manually runs the auger (this is a momentary position switch).
R AUGER MANUAL	MAN: Manually runs the auger (this is a momentary position switch).
L (FRONT) AUGER	OFF: Belts will not run in AUTO or MASTER Mode. MASTER: Position and when the MASTER SW is selected allows the left (front) auger to run until the auger diaphragm switch turns it off. AUTO: ON position enables the front auger to run until the diaphragm switch turns it off.
R (REAR) AUGER	OFF: Belts will not run in AUTO or MASTER Mode. MASTER: Position and when the MASTER SW is selected allows the right (rear) auger to run until the auger diaphragm switch turns it off. AUTO: ON position enables the rear auger to run until the diaphragm switch turns it off.
STATION SHIFT	LEFT: Will move the operator station to the left. RIGHT: Will move the operator station to the right. WARNING: BE SEATED AND WEARING YOUR SEAT BELT BEFORE USING THIS AND ANY OTHER OPERATIONS. NOTE: When transporting your chip spreader you MUST INSTALL THE TRANSPORT CAB TURN BUCKLES (CHAINS) SECURELY!
HITCH	OPEN: Used to open the hitch. CLOSED: Used to close the hitch.
HITCH LIFT Optional Equipment	UP: Moves the hitch up. DOWN: Moves the hitch down.
MASTER (Open/Close)	ON: Opens the chip box gate air cylinders. When the master switch is selected the CRC system will totalize distance covered.
MEET LINE	TOGGLE: As you approach the line where you are going to close the gates, leave the Master switch ON, now toggle the Meet Line switch once to close the gates, go back to get the next truck, as you come back the line where you closed the gates the CRC system will automatically re-open the gates.
L GATE OPERATION	ON: If the switch is ON (up) and the chipper is full width when you turn ON the Master switch those gates will open. OFF: Individually you can close one or more gates.

Table 3-2. Control Panel Switches for (Error! Reference source not found.)

Switch	Function
R GATE OPERATION	<p>ON: If the switch is ON (up) and the chipper is full width when you turn ON the Master switch those gates will open.</p> <p>OFF: Individually you can close one or more gates.</p>
L GATE (←→)	<p>LEFT BOX TOGGLE LEFT: Each time you toggle this switch to the left it will add a gate command so that gate can open if the individual gate switch is ON.</p> <p>LEFT BOX TOGGLE RIGHT: Each time you toggle this switch to the right is will remove a gate command so that gate is off even if you have that gate switch ON.</p>
R GATE (←→)	<p>RIGHT BOX TOGGLE RIGHT: Each time you toggle this switch to the right it will add a gate command so that gate can open if the individual gate switch is ON.</p> <p>RIGHT BOX TOGGLE LEFT: Each time you toggle this switch to the left is will remove a gate command so that gate is off even if you have that gate switch ON.</p>
HORN	PUSH: Press the button to activate the horn.
CRUISE CONTROL Optional Equipment	<p>ON: Turns the power on for the cruise control.</p> <p>SET/DEC: Must be in (1) in forward, (2) stepping on the accelerator pedal, (3) moving above 200FPM (4) Transfer case out of neutral.</p>

Computer (CRC) Functions – Home Page (page-1)

Operators should thoroughly understand the computer controls and functions, which are shown in (Error! Reference source not found.) and listed in (Table 3-3.)

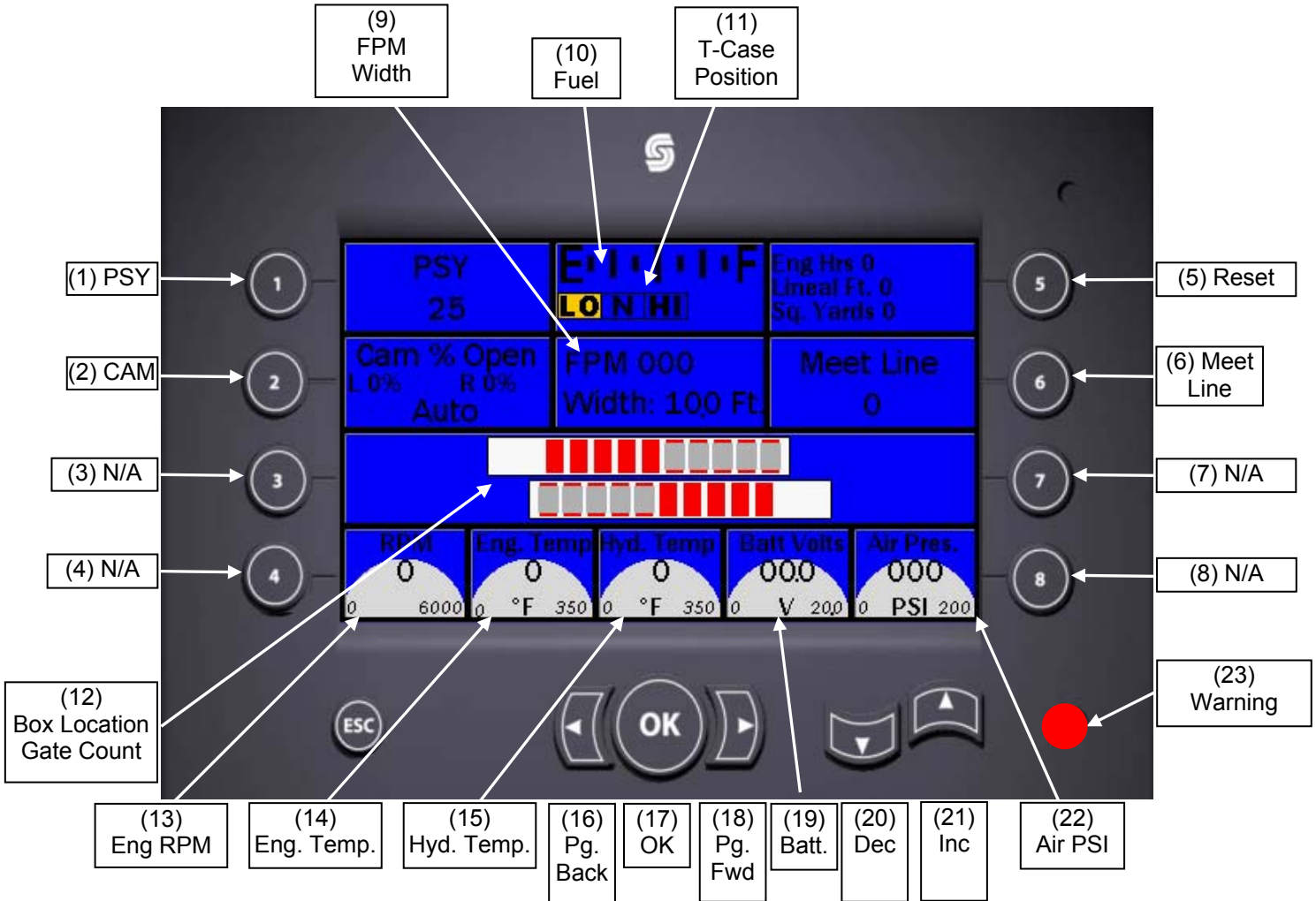


Figure 3-4. Computer Functions View-1 Home Page (page-1)

Table 3-3. Computer (CRC) Functions for (Error! Reference source not found.)

No.	Control	Function
1	Pounds Per Square Yard (PSY)	Press button #1 once and the PSY box will turn white; it is now in the edit mode. Use the Inc #23 / Dec #22 to change the PSY setting. When done press OK to save changes.
2	CAM Position	<p>L%: Indicates the actual cam position of the left (front box 0% to 100%)</p> <p>R%: Indicates the actual cam position of the right (rear box 0% to 100%)</p> <p>AUTO: In this mode the Left (node5) & Right (node6) receive a % cam open command, each node than tries to maintain the command % open.</p> <p>MANUAL: Press button #2 once and the box turns white and the cam in manual mode and will open to the manual command number displayed, when in this manual mode you can increase / decrease the manual command number by using the Inc #23 / Dec #22 to change the PSY setting.</p> <p>OFF: Press button #2 once more and the cam command is turned OFF. When traveling from area to another it is recommended to turn OFF the CAM.</p>
3	n/a	Not applicable to this page.
4	n/a	Not applicable to this page.
5	RESET	<p>RESET: Press and hold button #5 for three seconds to clear the logged data.</p> <p>NOTE: this will reset the Lineal Feet & the Square Yards</p>
6	MEET LINE START SET POINT	<p>MEET LINE START SET POINT: Press button #6 the box turns white indicating edit mode is selected, use the Inc. ↑ / Dec. ↓ buttons to set the desired value.</p> <p>When using the meet line function this setting is used to set the distance when the gates re-open while approaching the meet line. See (Error! Reference source not found.) & (Table 3-2) for details on operation of this feature.</p>
7	n/a	Not applicable to this page.

Table 3-3. Computer (CRC) Functions for (Error! Reference source not found.)

No.	Control	Function
8	n/a	Not applicable to this page.
9	FPM (MPM) Displayed	Displays the travel speed of the chip spreader. Displayed in feet per minute (FPM) / meters per minute (MPM).
10	FUEL GAUGE	Fuel gauge is a green bar graph E to F.
11	TRANSFER CASE INDICATOR (L-N-H)	L: Low indicates that the transfer case is in low range. N: Neutral indicates that the transfer case in neutral. H: High indicates that the transfer case is in low range. WARNING: ALWAYS APPLY PARKING BRAKES BEFORE LEAVE OPERATOR SEAT!
12	BOX GATE OPERATION	BOX / GATE LOCATION SELECTION DISPLAY SEE: Selecting gates Table 3-4. Box Position Display (Error! Reference source not found.)
13	ENGINE RPM	This engine RPM reading is coming from the belt driven alternator tachometer terminal. NOTE: if this reading is more than 50 RPM less than the Murphy gage, your alternator belt is slipping.
14	ENGINE TEMP	Engine coolant temperature display in Fahrenheit (F) or Celsius (C). NOTE: This reading is from the Cummins engine computer and read off the J1939 CAN system.
15	Hyd. Temp	Displays the temperature of the hydraulic oil exiting the oil cooler. Displayed in Fahrenheit (F) or Celsius (C).
16	← PAGE BACK	Takes you back a page.
17	OK	Used in all computer functions to save a setting.
18	→ PAGE FORWARD	Takes you to the next page.
19	BATTERY VOLTS	VOLTS: This voltage is read internal to node3. Normal voltage range is 12.5Vdc to 14.8Vdc.
20	↓ (Dec Switch)	Used to change any numeric value, the item must be selected using the corresponding button next to the item to be selected, it is indicated when the value box background is white. Than use the down arrow to decrease the value
21	↑ (Inc Switch)	Used to change any numeric value, the item must be selected using the corresponding button next to the

Table 3-3. Computer (CRC) Functions for (Error! Reference source not found.)

No.	Control	Function
		item to be selected, it is indicated when the value box background is white. Than use the up arrow to increase the value
22	Air Pressure	Displays the current air pressure in PSI or Bar
23	Warning	Warning/Fault: when flashing RED, go to the diagnostic pages to see what fault has been detected. NOTE: If the fault condition is a critical fault than engine will be shut-down and the fault condition must be fixed.

Computer Calibration page - (page2)

Operators should thoroughly understand the computer controls, function and calibration, which are shown in (**Error! Reference source not found.**) and listed in (Table 3-5.)



Figure 3-5. Computer Calibration Page

Table 3-5. Computer Calibration Page for (Error! Reference source not found.)

No.	Control	Function
1	PSY Correction	<p>Adjusts the cam opening, used for calibrating the cam. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.</p> <p>Positive = Putting in a positive number will open the cam more, to spread more chips.</p> <p>Negative = Putting a negative number will close-up the cam, to spread lease chips.</p> <p>NOTE: See cam calibration procedure (???)</p>
2	Chip Box Balance	<p>Increasing the number the CRC will open the right (rear) box more in relation to the left (front), decreasing the number (negative numbers) will close the right (rear) box in relation to the left (front) box. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.</p> <p>NOTE: This is a fine balance control; you should always make sure your gates have been properly adjusted with the cam lobe.</p> <p>NOTE: See manual for cam adjustment procedures.</p>
3	MANUAL OPEN	<p>This set point value is used when the cam manual selection is made. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.</p>
4	Hopper Set-up	<p>See: Hopper width set-up.</p> <p>Note this button will bring you to another page.</p>
5	Sim. FPM On/Off	<p>Used to change from the CRC control reading the chip spreader speed from the speed sensor to using the FPM value entered in the Sim. FPM box. The default setting is CRC reading the speed sensor. To change from speed sensor FPM, press and hold the simulate switch (button #8) for 3 seconds. The CRC will now use the simulate FPM value. To return to read the speed sensor, press and hold the AUTO switch again for 3 seconds, the computer will resume reading the speed sensor. NOTE: When the system is powered down and back-up it will default to reading the speed sensor.</p>
6	F-Cal	<p>This value is used to adjust the linear feet the CRC</p>

Table 3-5. Computer Calibration Page for (Error! Reference source not found.)

No.	Control	Function
		<p>totals while the chip box gates are open in comparison to the actual distance traveled. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.</p> <p>Increase number = If the number of feet totaled in the CRC is lower than the actual feet traveled you will need to increase this value.</p> <p>Decrease number = If the number of feet totaled in the CRC is higher than the actual feet traveled you will need to decrease this value.</p> <p>NOTE: This number is a percentage relationship to the actual number.</p> <p>Example: If your displayed linear feet traveled is 5% lower than your actual feet traveled you will need to raise your F-Cal by 5%.</p>
7	n/a	Button not used on this page.
8	MORE	More button (#8) will bring you to another calibrate page.
9	← Page Back	Takes you back a page.
10	OK	Used in all computer functions to save a setting.
11	→ Page Forward	Takes you to the next page.
12	↓ (Dec Switch)	Used to change any numeric value, the item must be selected using the corresponding button next to the item to be selected, it is indicated when the value box background is white. Than use the down arrow to decrease the value
13	↑ (Inc Switch)	Used to change any numeric value, the item must be selected using the corresponding button next to the item to be selected, it is indicated when the value box background is white. Than use the up arrow to increase the value

Computer Controls Hopper Set-up Width - Calibration page

Operators should thoroughly understand the computer controls, function and calibration of the chip box width set-up, which are shown starting at (**Error! Reference source not found.**)

1. Enter the Hopper Setup page by pressing (button #4) on the calibrate page.



Figure 3-6. Hopper Width Access the Set-up Page

2. The Hopper Width Set-up should look like this.



Figure 3-7. Hopper Width Set-up Page

3. Select/edit the hopper size by pressing button (#1), when the background is white you are in the edit mode.
4. Now use the inc. (↑) dec. (↓) to set the hopper size of your chip spreader.
5. Press OK to save the new value.

NOTE: The box position indicators show the boxes retracted, with 10 possible gates on each chip box for a 20 foot chip spreader.

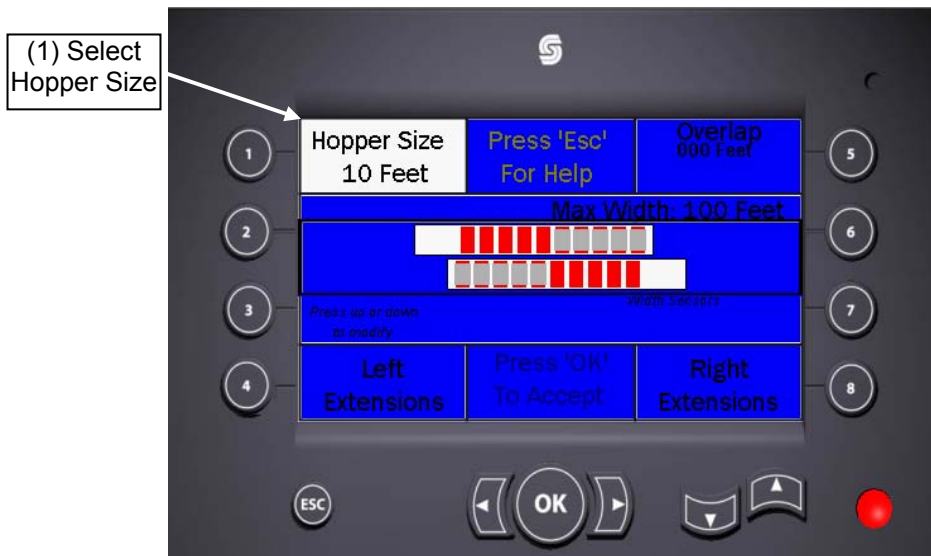


Figure 3-8. Hopper Width Select/Edit (part 1 of 2)

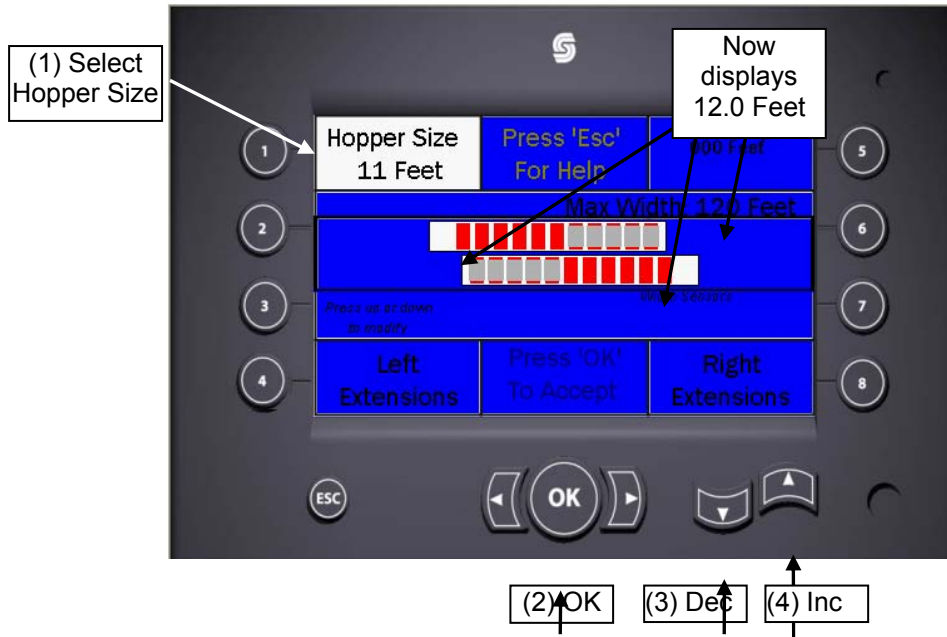


Figure 3-9. Hopper Width Select/Edit (part 2 of 2)

Computer Controls Hopper Width Auto/Manual Override

1. Press button (#4) for the Left Extensions.
2. Use the Left (←) to added gates and the right (→) to remove gates.
3. Press OK to save the new value.

NOTE: The box position indicators shows the one left gates added in this example and displays 11 gates possible on the left chip box.

4. Repeat steps 1 -3 for Right Extensions.

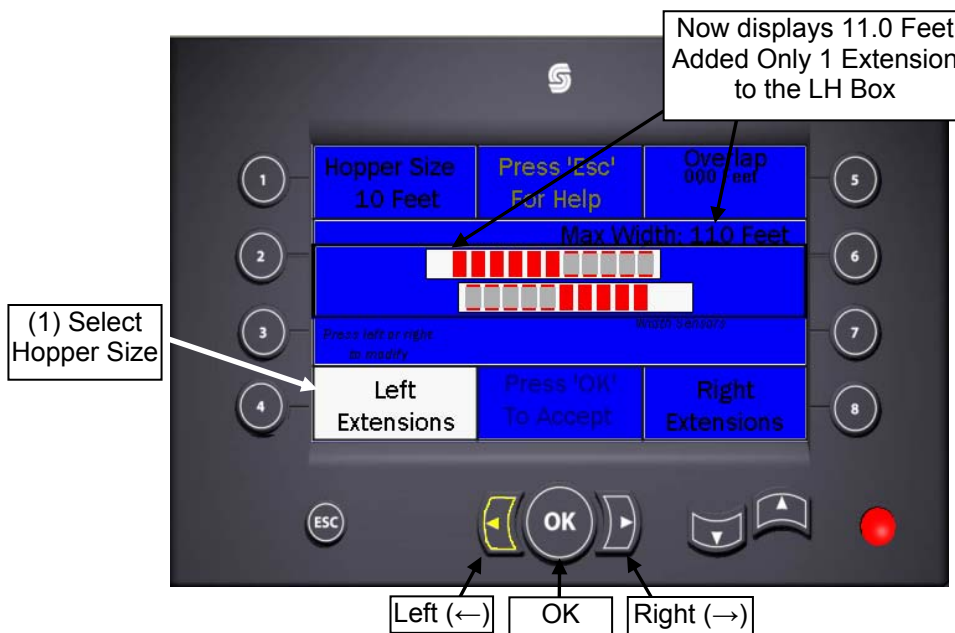


Figure 3-10. Hopper Extension Select/Edit

Spread Hopper Auto/Manual Width Select (override)

Operators should thoroughly understand the computer controls, function and calibration of the chip box width measurement, which are shown starting at (**Error! Reference source not found.**) You can get here by starting at the calibration page select the Hopper Setup (button #4).

- Normal operation the width sensors measure the chip box position by, measuring the amount of oil used to extend the box position cylinders, this is accomplished with a hydraulic motor in series with the hose going to the cap end of the box extend cylinder. There is a pulse pickup (PPU) in this motor as the box extends the CRC system counts the pulses and establishes the box position. This is displayed on the front page by showing the box position, it also used to automatically disable the gates switches of the overlapped gate in the center, allow the operator to do a tapper cut faster using the tapper switch because the CRC system will automatically go to the next gate that needs to be closed or opened. This is also the measurement used to calculate the Square Yards covered.
- If LH or RH sensor is not working or you want to disable this feature. See (**Error! Reference source not found.**) and follow the steps below:
 1. Press button (#5) the background is white you are in the edit mode.
 2. Press button (#5) again, the Auto mode is changes to Manual mode and the words are in RED. (Note: follow instruction on the screen)
 3. Press OK to save the new value.
 4. Repeat steps 1 -3 to return to the Auto mode.

Select Box Over-lap Setup



Figure 3-11. Hopper Auto/Man Width Select (part 1 of 2)

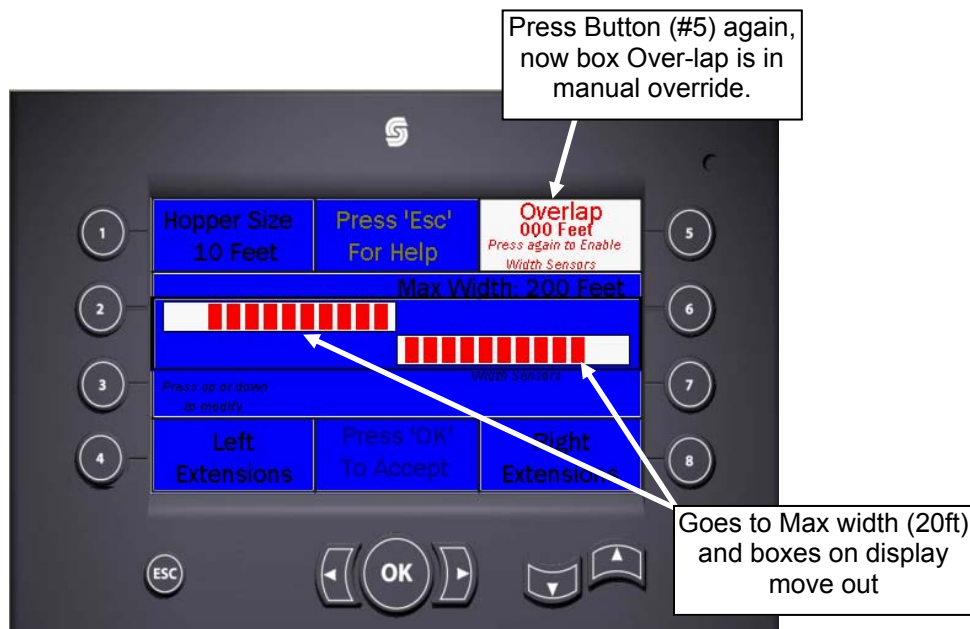


Figure 3-12. Hopper Auto/Man Width Select (part 2 of 2)



Computer Controls Pan Weight Calibration page (PSY Correction)

Operators should thoroughly understand the computer controls, function and calibration of the chip box cam, which are shown in (Error! Reference source not found.) and listed in (Error! Reference source not found.)

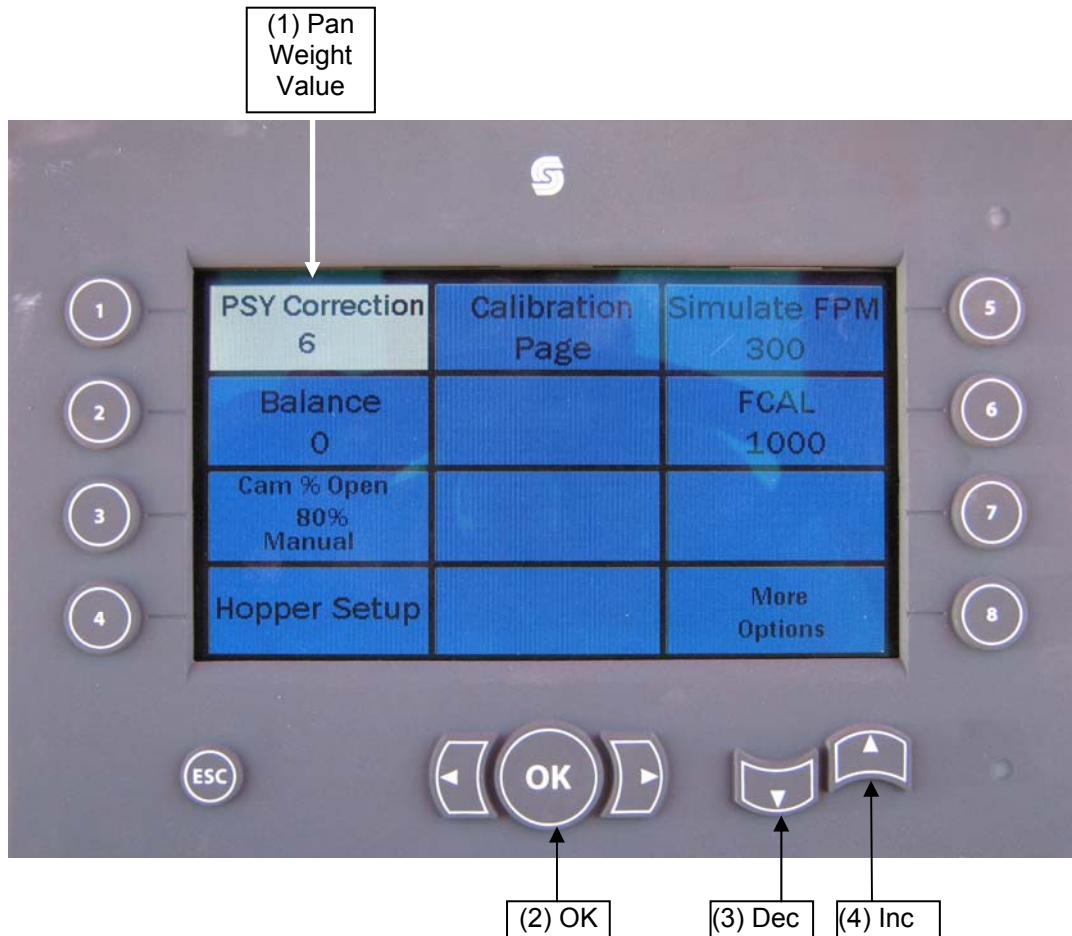


Figure 3-13. Computer Controls Pan Weight

Table 3-6. Computer Controls Pan Weight (Error! Reference source not found.)

No.	Control	Function
1	Pan Weight	Displays the pan weight value you are going road the calibrated value the CRC uses.
2	OK	Press and hold to accept the new pan weight value, the pan weight box will display that the calibration was accepted.
3	↓ (Rate Dec Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading less than expected pounds per square yard (PSY) you will put a positive number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that not enough material was spread, so the will CRC will control the CAM to spread more material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>
4	↑ (Value Inc Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading too many pounds per square yard (PSY) you need to put a negative number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that too much material was spread, so the will CRC will control the CAM to spread less material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>

Computer Controls Cam Box Balance Cal. page

Operators should thoroughly understand the computer controls, function and calibration of the chip box cam balance, which are shown in (Error! Reference source not found.) and listed in (Error! Reference source not found.)

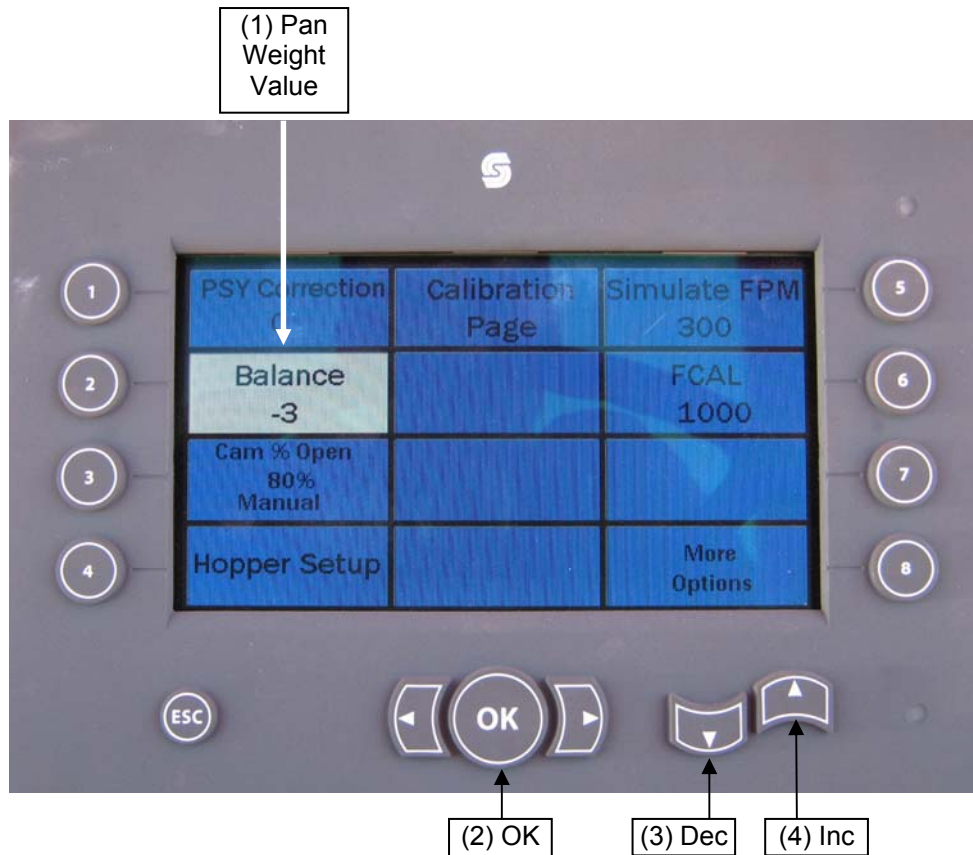


Figure 3-14. Computer Controls Box Balance

Table 3-7. Computer Controls Box Balance (Error! Reference source not found.)

No.	Control	Function
1	Chip Box Balance	<p>Increasing the number the CRC will open the right (rear) box more in relation to the left (front), decreasing the number (negative numbers) will close the right (rear) box in relation to the left (front) box. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.</p> <p>NOTE: This is a fine balance control; you should always make sure your gates have been properly adjusted with the cam lobe.</p> <p>NOTE: See manual for cam adjustment procedures.</p>
2	OK	<p>Press and hold to accept the new pan weight value, the pan weight box will display that the calibration was accepted.</p>
3	↓ (Rate Dec Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading less than expected pounds per square yard (PSY) you will put a positive number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that not enough material was spread, so the will CRC will control the CAM to spread more material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>
4	↑ (Value Inc Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading too many pounds per square yard (PSY) you need to put a negative number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that too much material was spread, so the will CRC will control the CAM to spread less material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>

Computer Controls Cam Manual Setup Cal. page

Operators should thoroughly understand the computer controls, function and calibration of the chip box cam balance, which are shown in (Error! Reference source not found.) and listed in (Error! Reference source not found.)

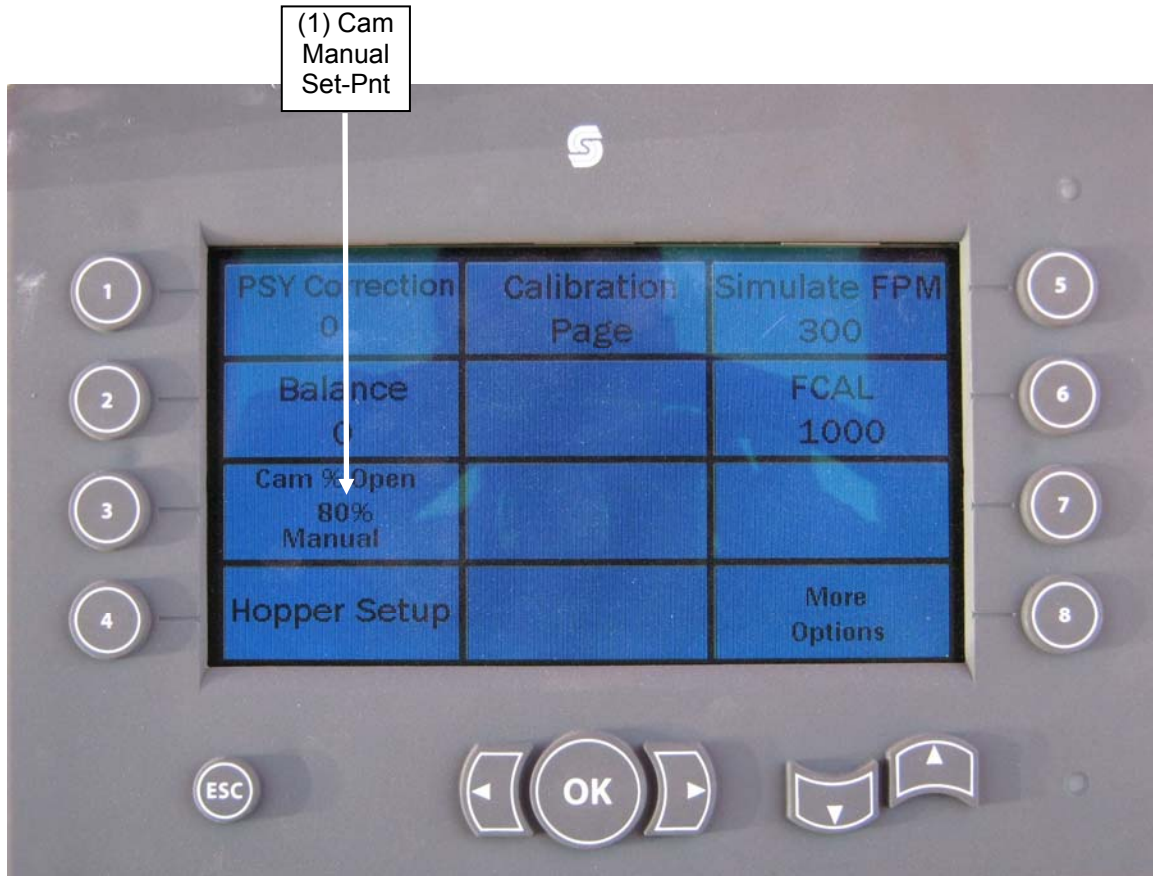


Figure 3-15. Computer Controls CAM Manual Control

Table 3-8. Computer Controls Box Balance (Error! Reference source not found.)

No.	Control	Function
1	MANUAL OPEN	This value is the set point used when the cam manual selection is made. Edit value by selecting this box, when the background is WHITE use the increase/decrease switches, when done editing press the OK button.
2	OK	Press and hold to accept the new pan weight value, the pan weight box will display that the calibration was accepted.
3	↓ (Rate Dec Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading less than expected pounds per square yard (PSY) you will put a positive number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that not enough material was spread, so the will CRC will control the CAM to spread more material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>
4	↑ (Value Inc Switch)	<p>Used to change the value in the pan weight box.</p> <p>If the chip spreader is spreading too many pounds per square yard (PSY) you need to put a negative number in the pan weight box, than press and hold OK for 5 seconds. (You are telling the CRC that too much material was spread, so the will CRC will control the CAM to spread less material PSY).</p> <p>NOTE: Approximately 1 = increase by 1lbs. -1 = decrease by 1lbs.</p> <p>See spread rate calibration for detailed instructions.</p>

Computer Gate Control Switches

The gate select switches can also be used to control or change spread width while spreading. (Figure 3-16) shows several spread pattern examples.

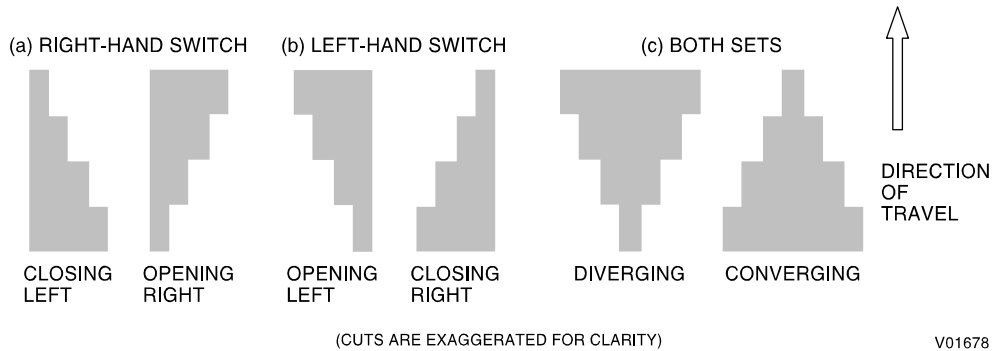


Figure 3-16. Examples of the Use of Computerized Gate Controls

Operators should thoroughly understand the computer controls, function, calibration and switches which are shown in (Figure 3-17) and listed in (**Error! Reference source not found.**)

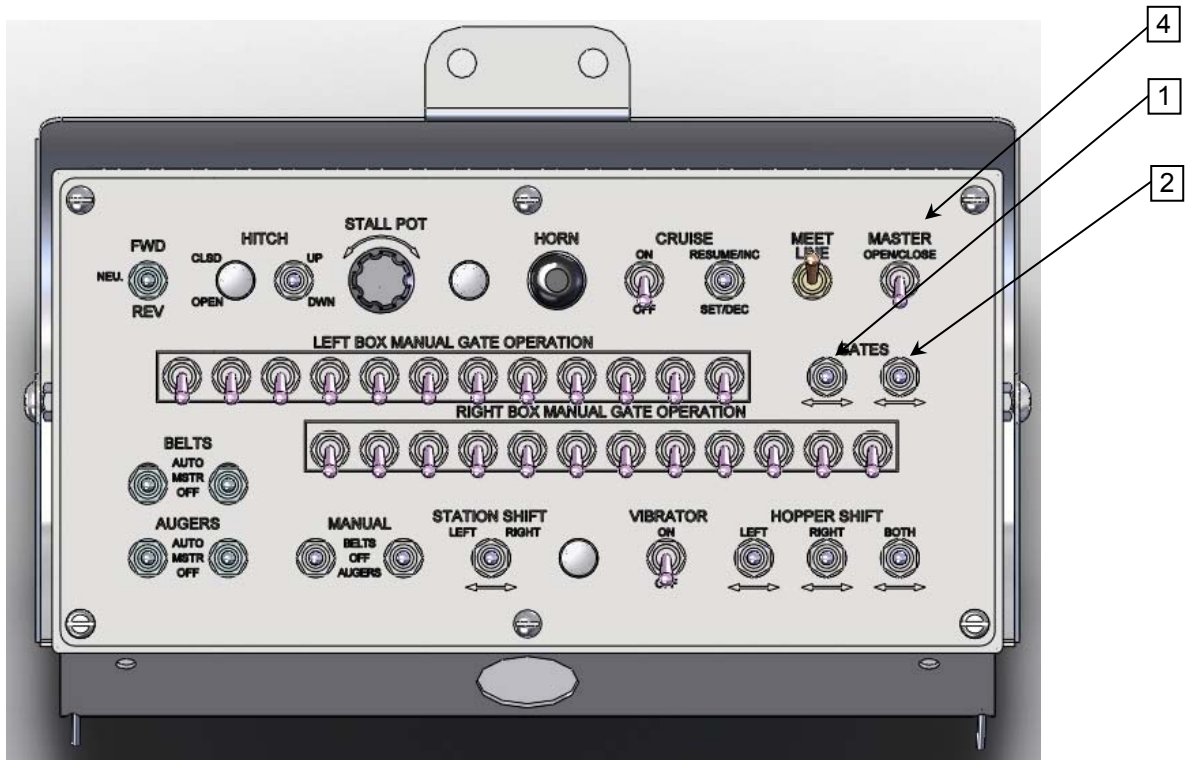
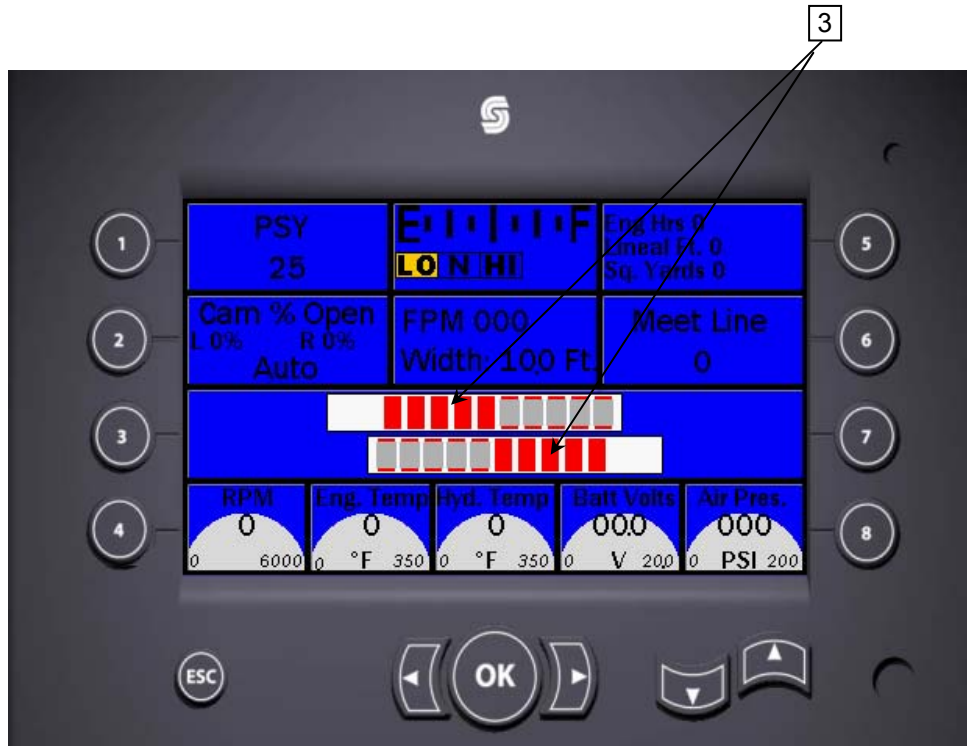


Figure 3-17. Computer Gates Control Switches

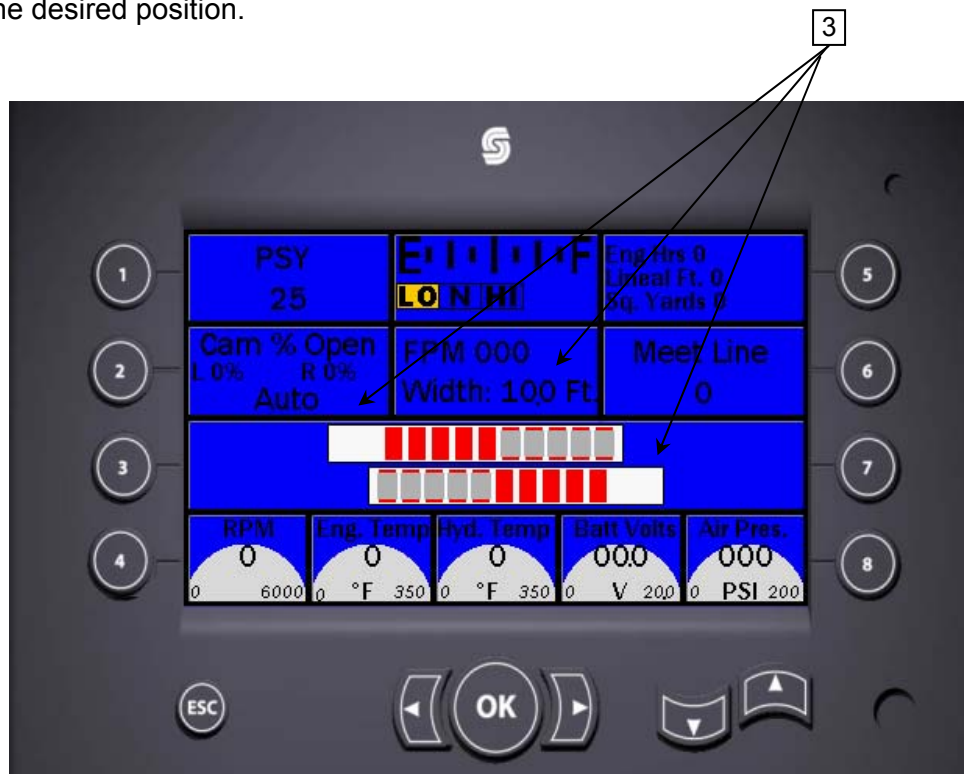
Table 3-9. Computer Gate control Switches for (Figure 3-17)		
No.	Control	Function
1	← (Gate Select Switch)	Pressing this switch repeatedly closes the gates from left to right and pressing repeatedly back the gates will re-open right to left. Note: The gate selected indicator are the RED boxes in the rectangle spread hopper boxes, indicating that all gates are selected (RED) when you turn on the MASTER switch to open the gates the RED boxes will turn GREEN.
2	→ (Gate Select Switch)	Pressing this switch repeatedly closes the gates from right to left and pressing repeatedly back the gates will re-open left to right. Note: The gate selected indicator are the RED boxes in the rectangle spread hopper boxes, indicating that all gates are selected (RED) when you turn on the MASTER switch to open the gates the RED boxes will turn GREEN.
3	GATE COUNT	Indicates the number of gates selected (in this case the gates in RED are selected to open when the Master Switch is opened). When the master switch is opened the RED boxes will turn GREEN.
4	OPEN/CLOSE (MASTER)	Opens/Closes all selected gates.

Setting Spread Hopper Width

WARNING: ALWAYS KEEP YOUR FINGERS CLEAR OF THE AGGREGATE GATES. IF A GATE SHOULD CLOSE UNEXPECTEDLY, SERIOUS PERSONAL INJURY MAY RESULT.

WARNING: KEEP CLEAR OF ALL MOVING PARTS. THE SPREAD HOPPERS ARE HYDRAULICALLY ACTUATED. IMPROPER OR UNSAFE OPERATION MAY CAUSE SERIOUS PERSONAL INJURY.

1. Determine the maximum spread width required for the job.
2. Use the HOPPER SHIFT switches on the control panel, or the remote control box at the top of the right-hand conveyor (Figure 3-18), to extend the spread hoppers to the desired position.



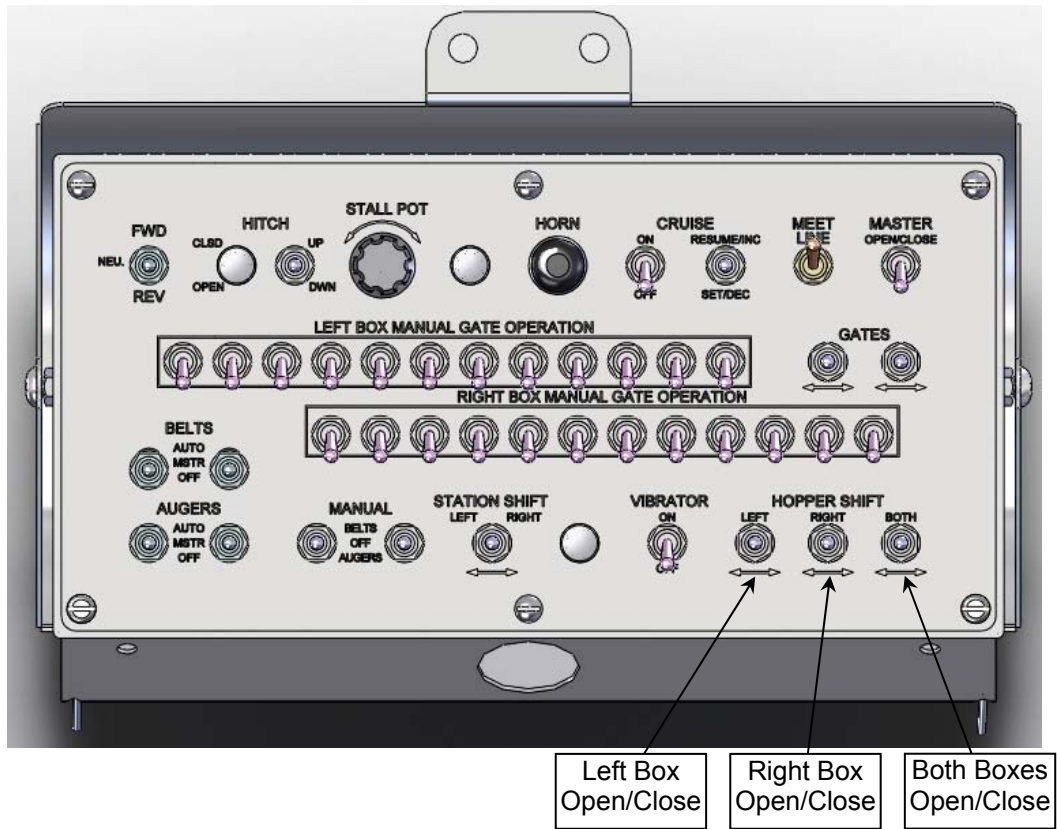


Figure 3-18. Spread Hopper Width Control

- Test the aggregate gates for free movement by selecting the number of gates required for the job, using the master gate control switch located on the control panel. (Figure 3-19).

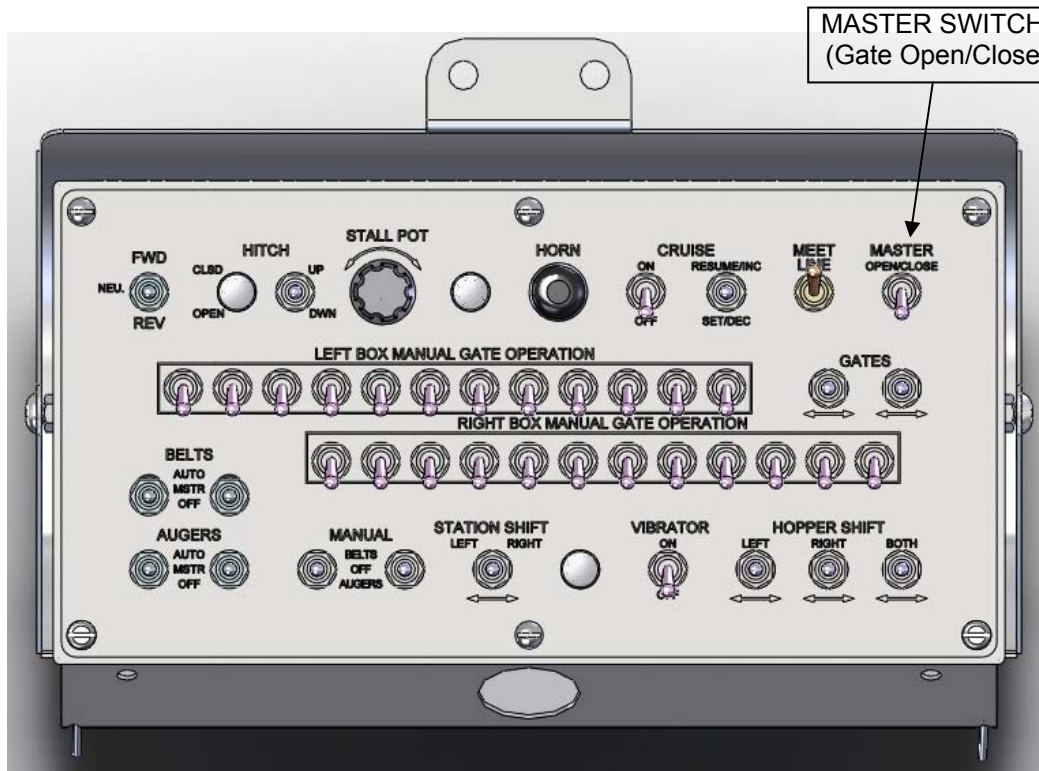


Figure 3-19. Master Gate Switch

- Fill the hoppers and perform the WEIGHT CALIBRATION and DISTANCE CALIBRATION procedures.

Weight Calibration

WARNING: POTENTIALLY LIFE-THREATENING HAZARDS MAY EXIST DURING EQUIPMENT OPERATION. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO OPERATE, SERVICE, OR MAKE ADJUSTMENTS TO THE BEARCAT EQUIPMENT.

Proper weight calibration ensures the computer controlled aggregate gates are opening to the exact extent required to deposit the specified amount of aggregate, under all operating conditions.

This procedure should be performed on a level surface and a constant speed, also the speed needs to be great enough to have the cam at least 15% to 25% open or opening to the % you will be doing your job. (Should always do your calibration with the cam 15% to 85% open)

NOTE: You should try to calibrate around the speed that you will be doing your chip spreading job.

NOTE: It is not necessary to perform the weight calibration with all gates open. Select a spread width that allows the operator to cover the canvas (4 to 6 feet).

This weight calibration should be carried out whenever the aggregate material is changed to one of a different type or from a different source.

5. Fill the hoppers with the new aggregate.
6. Place the yard-square piece of canvas (furnished) and the scale provided and set the scale to zero.
7. Lay the canvas out flat on level ground.
8. Use the controls to enter the PSY (pounds-per-square-yard) value desired for the job.
9. Drive the chip spread around, find out what speed you need to travel to have the cam atleast 15% to 25% open or travel at the speed you will be doing your chip sealing job at.
10. On the Control Panel, position the following switches to AUTO:
R and L BELTS
FRONT and REAR AUGER
11. Drive the machine as follows:
 - A. Set the FWD-REV switch to FWD.
 - B. Give yourself plenty of distance to get moving at the required speed, press the accelerator pedal down, and get up to your required speed.

NOTE: This MUST be done on a smooth surface.

- C. Drive toward the canvas square. Position the gate switch to OPEN to begin spreading just before reaching the canvas square (the chip spreader must be traveling at the required speed for the job).
12. After passing over the canvas, position the gate switch to CLOSE and stop the machine by releasing the foot pedal.
13. Use the scale to weigh the canvas with the deposited aggregate.
14. If the actual weight differs from the value entered in Step 8, go to the CAL page PSY Correction (**Error! Reference source not found.**) use the PSY correction number to adjust the system to spread the correct amount of chips.

15. Select the PSY Correction by pressing button #1 when the background is white the PSY Correction can be edited. Use the “↑ - ↓” controls to enter the weight needed to make the chip spreader spread the required PSY (K/sM). **SEE NOTES BELOW**

NOTE: TOO HEAVY: If the actual amount of chips spread is MORE than the desired amount you will put in a negative number telling the CRC that you want LESS material.

NOTE: TOO LIGHT: If the actual amount of chips spread is LESS than the desired amount you will put in a positive number telling the CRC that you want MORE material.

16. Press & hold the OK button.

NOTE: If the difference between the entered PSY (k/sM) and the actual weight is large, a second calibration run may be necessary. If necessary, repeat Step 7 thru Step 16.

NOTE: Always run a final test after you made an adjustment to the PSY Correction.

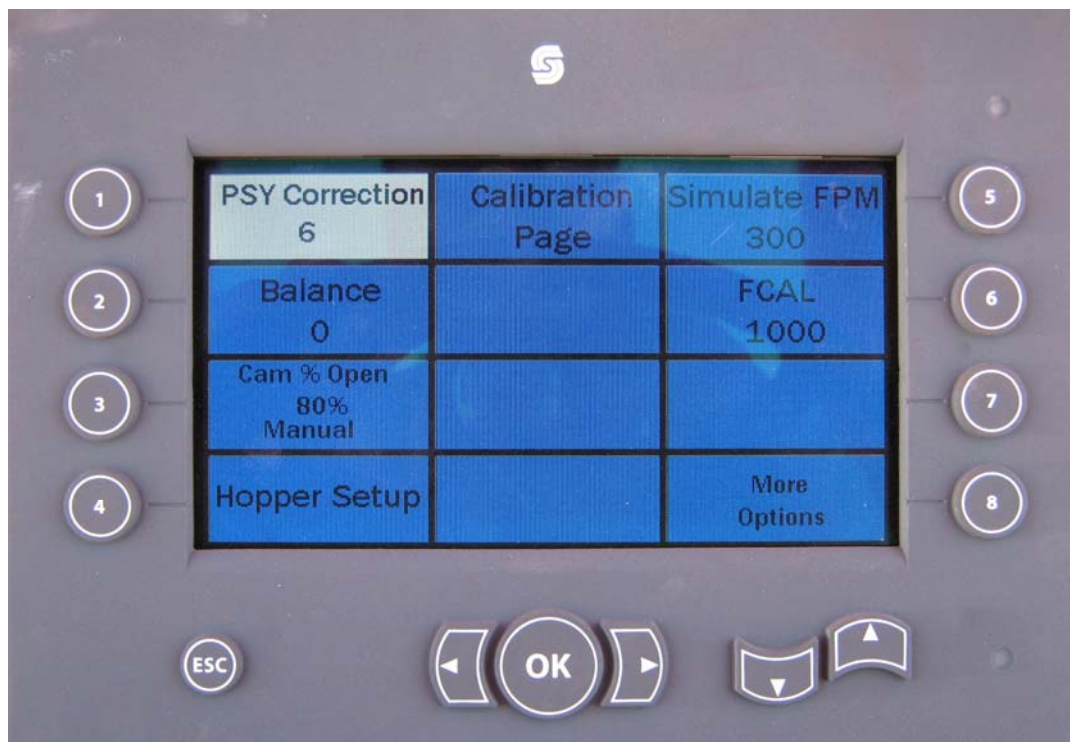


Figure 3-20. Pan Weight Cal Page

Distance Calibration

Proper distance calibration ensures the correlation between machine ground speed and chip-spreading density is accurately maintained through the distance-measuring circuits in the CRC computer.

This procedure should be performed once in each operating season. It is not necessary that the receiving hopper or spread hoppers be filled.

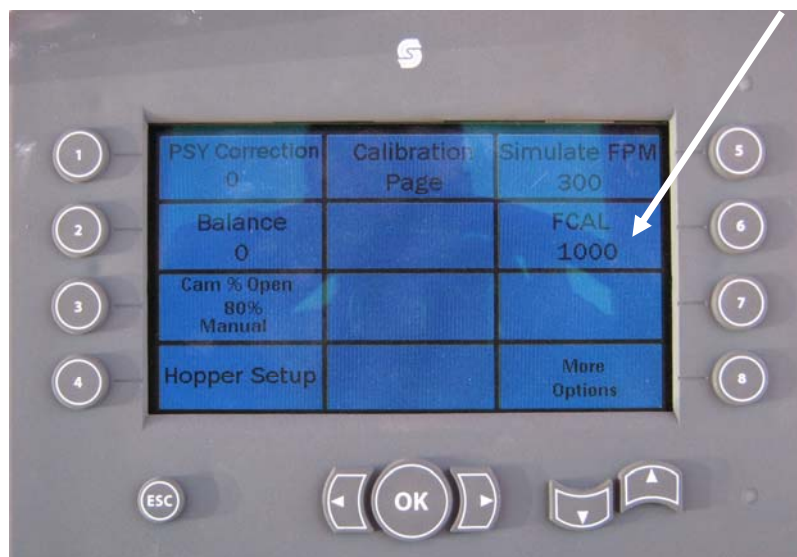
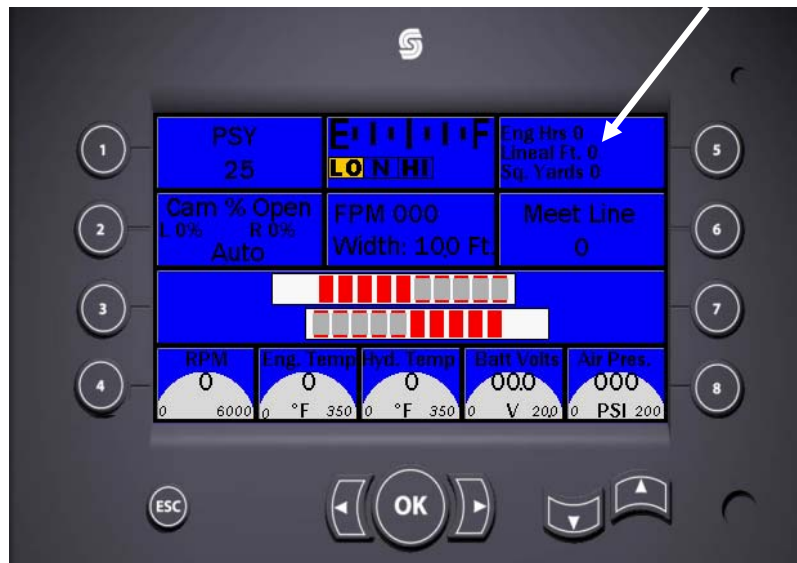


Figure 3-21. Computer Display During Distance Calibration

1. When at the front page press and hold button (#5) until the linear foot counter is resets to zero.
2. Set the FWD-REV switch to FWD, press the foot pedal until the display indicates approximately 300 FPM.
3. Turn the gate switch (Master Switch) to OPEN and drive a carefully measured distance of 1000 feet.
4. At exactly 1000 feet, position the gate switch (Master Switch) to CLOSE and stop the machine by releasing the foot pedal. The FEET display should now read approximately 1000.
5. If it doesnot display 1000, go to page two, (the calibrate page).
6. Using the select button (#6) toggle until the F-Cal value background is white.
7. Using the “increase ↑ and decrease ↓ to lower or raise the displayed FEET until it distance traveled on the front page reads 1000.
8. When the display reads 1000, press OK. The distance calibration is now complete. You can go back to the main page and use the chip spreader.
9. Note the new distance (footage) calibration number (F-Cal) and enter it on the title page of this manual. The computer control can be reset to this number if the box is replaced or the number is changed. If this number is used, the unit will not require a complete distance calibration.

Operator Station Adjustments

Control Panel

Select on which side of the machine to operate. The operator station swings left or right by using the station shift toggle switch on the operator control panel. During the course of the workday, the operator may change sides. Height and distance from the right arm rest can be adjusted by loosening the clamp on the mounting pole and sliding the operator control panel to a position that fits the operator. You also adjust the steering wheel tilt, by pushing down on the tilt release and position the steering wheel in a comfortable position.

Bi-View Mirrors

Optional bi-view mirrors are designed to give the operator a view of the blind side of the machine and the level of aggregate in each spread hopper. The mirror opposite to the operator’s position gives a view of the blind side and the end of the spread hopper. The mirror on the same side of the operator gives a view of the center of the hoppers.

Hitch Adjustments

Height

The hitch can be adjusted up and down using the chains. Pick the hitch up with one hand and move the links in or out of the slots, as desired.

NOTE: An optional hydraulic hitch lift can be adjusted from the control panel.

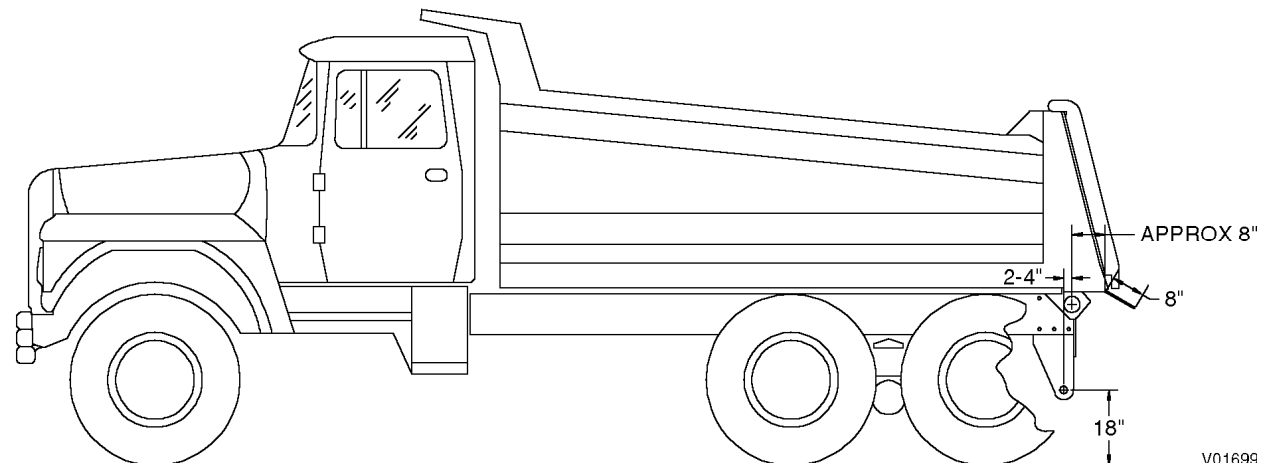
Fore and Aft

The hitch fore and aft adjustments are located between the conveyor rails underneath the chipper. Pull the spring pin and remove the bolt, there are four holes for adjustment.

NOTE: Be sure to replace the bolt, nut and spring pin.

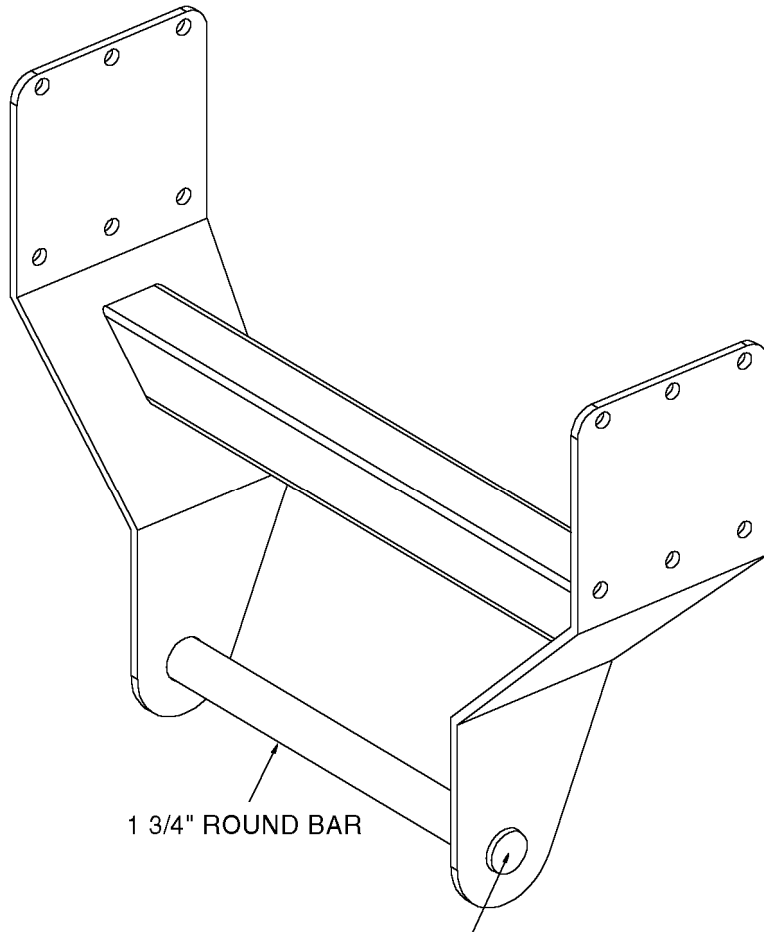
Chip Spreader Hitch Bar Requirements

The location and measurements required to position the chip spreader hitch bar on the aggregate supply dump truck are shown in Figure 3-22. Figure 3-23 shows an example of the hitch bar. The exact positioning of the hitch bar is required for consistent aggregate flow to the receiving hopper without unnecessary spillage.



V01699

Figure 3-22. Hitch Bar Location on Dump Truck



NOTE: MUST BE 18" OFF GROUND V01700

Figure 3-23. Typical Hitch Bar





**SECTION - 4
OPERATING INSTRUCTIONS**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

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SECTION 4. OPERATING INSTRUCTIONS

Mechanical Startup

Before starting the Chip Spreader, complete the fluid checks and visual inspection described under SECTION 3. PREPARING EQUIPMENT FOR USE.

WARNING: YOUR CONTINUED GOOD HEALTH AND EVEN YOUR LIFE MAY DEPEND ON FOLLOWING THE RULES OF OPERATION SET FORTH IN THIS MANUAL. ALWAYS REMEMBER THAT CHIP SPREADING MACHINES CAN BE DANGEROUS. THEY CONTAIN EXPOSED MOVING PARTS AND BELTS, AND THEY MOVE LARGE AMOUNTS OF ABRASIVE MATERIAL AT HIGH SPEED. YOU MUST OPERATE THIS MACHINE CAREFULLY TO PROTECT YOURSELF FROM PAINFUL OR EVEN FATAL INJURY. HAZARDS ASSOCIATED WITH THIS MACHINE, AND THE NECESSARY PRECAUTIONS TO AVOID DANGER, ARE GIVEN IN THIS MANUAL.

1. Set the following controls as specified:
 - SET PARKING BRAKE (PULL)
 - R and L BELTS (OFF)
 - FRONT and REAR AUGER (OFF)
 - FWD-REV NEUTRAL
 - TRANSFER CASE NEUTRAL
 - FOOT OFF ACCELERATOR PEDAL (OFF)
2. Start the engine, to engage the hydraulic dump valve you need to turn on function, like the FWD/RED, the a belt or an auger, etc. NOTE: if you do not turn on a fuction after 10 minutes of running the hydraulic dump valve will close.
3. Extend the spread hoppers to the desired width for the job.
4. Set the following controls as specified:
 - MASTER ON
 - R and L BELTS AUTO or AUTO w/MASTER
 - FRONT and REAR AUGER AUTO or AUTO w/MASTER
5. Use the “↑↓” computer controls to enter the PSY or KgSM value desired for the job. The PSY or the KgSM may be adjusted during the run if necessary.
6. Release the parking brake.

Operation

Drive the Chip Spreader as follows:

7. Set the FWD-REV switch to the desired direction.
8. Select transfer case high or low range. NOTE: You should always use HIGH range, unless you are in step grades that require low range. (High range will reduce wear and tare on you machine).
9. Select LOW Lock or HIGH Lock;
 - i. HIGH Lock the chip spreader operates normal, it will reach approximately 1675FPM (510MPM) in HIGH range and 700FPM (210MPM) in LOW range.
 - ii. LOW Lock the chip spreader speed is reduced, it will reach approximately 1100 FPM (335MPM) in HIGH range and 400FPM (120MPM) in LOW range.
 - iii. LOW LOCK/HIGH RANGE is good for working this gives the operator the best control to operate the chip spreader smoothly.
- B. Depress the service brake pedal.
- C. Release the parking brake.
- D. VERY SLOWLY AND GENTLY release the service brake, than VERY SLOWLY AND GENTLY press the right foot pedal down to see if the chip spreader moves. Make sure the transfer case is in gear.
- E. You can adjust the engine RPM at which the chip spreader starts to move by using the **stall pot** on the operator consol. (Full CCW the chipper should start to move at about 1050RPM, full CW the chip spreader should start to move at about 1650RPM) It is desirable to run the chip spreader with the stall pot set as low as possible and still have the belt s deliver enough chips for your job. By doing this is reduces noise and fuel consumption.

WARNING: KEEP CLEAR OF THE HITCH. YOU COULD BE INJURED IF IT ACTUATES AGAINST ANY PART OF YOUR BODY.

10. Adjust the hitch. On the control panel, push the HITCH switch to the OPEN position and hold for two seconds to open the hitch.
 - A. Back the chip spreader into the hitch bar of the aggregate supply dump truck. The driver of the dump truck should hold the brakes while the chip spreader is backed up.
 - B. To align the dump truck and chip spreader, center the bed of the dump truck within the receiving hopper opening.

NOTE: The optional hitch height can be adjusted from the control panel. (If equipped with the optional hydraulic hitch raise).

- C. The mouth of the hitch should center itself vertically on the hitch bar. If the hitch mouth is not centered because it is too high or low, use the chains that the hitch hangs from to adjust the height.
 - D. With the chip spreader hitch mouth pushing against the dump truck hitch bar, push the HITCH switch to the CLOSED position for two seconds to close the hitch.
 - E. If the position of the dump bed is either too far into the receiving hopper or too far out, the hitch can be adjusted fore and aft 6 inches to compensate.
11. Fill the receiving hopper with aggregate.
- A. Give the dump truck a small tug with the chip spreader to check if the hitch is locked.
 - B. Using hand signals, direct the dump truck operator to release the tailgate, tip the bed and dispense aggregate into the receiving hopper. The belts are still running from Step 4 in the Mechanical Startup. The spread hoppers should start filling with aggregate.

Setting Gate Opening for Manual Operation

This procedure enables the use of the machine in a non-automatic mode.

12. With the engine running and the cam operation selected to manual, set the manual opening on the calibrate page as discribed in section 3, check the cam open indicator as seen in (Figure 4-1) set to the same value at which the machine has been operating. NOTE: if you are going to chip in manual mode you will need to control the speed of the chip spreader to get your desired PSY of chips on the ground.

WARNING: ALWAYS KEEP CLEAR OF THE AGGREGATE GATES. IF A GATE SHOULD OPEN OR CLOSE UNEXPECTEDLY, SERIOUS PERSONAL INJURY COULD RESULT.

13. Drive the machine up to speed, then turn the MASTER switch ON to open the gates and OFF to close the gates.



Figure 4-1. Cam Open Indicator

NOTE: When operating in the manual mode, it is important to remember that any open gate will remain open the same distance no matter what speed the machine is driven. There is NO automatic control of PSY during manual override. In the manual mode, the most effective way to change PSY is by

changing speed with the CRC SPEED control. Speed variations as small as 2% can readily be made with this control. As speed is raised, PSY decreases.

14. Upon completing the run, use the cam auto/manual/off switch on the CRC display to return the cams to the closed position and close the gates.

Clearing a Clogged Gate

WARNING: NEVER INSERT YOUR HAND INTO A GATE. ALWAYS USE A METAL BAR OR ROD TO CLEAR AN OBSTRUCTION FROM A GATE. FAILURE TO DO SO MAY RESULT IN SERIOUS PERSONAL INJURY.

If a gate becomes plugged by a rock, perform the following:

15. On the CRC display, calibrate page set the manual cam open at 90% to 100%.
16. Use the cam auto/manual/off switch on the CRC main (home) page display press the button to select manual. The cam should open to the manual setting.
17. Select the clogged gate with the individual gate switch on the operator consol.
18. Open the gate (gates) from the consol using the Open/Close (Master) switch.
19. Remove the clog with a metal bar or rod.
20. When the clog is cleared, remove the metal bar and return the switches to their normal positions.

Shutdown on Completion of a Job

At the end of the job, perform the following steps:

NOTE: Step 1 and Step 2 should always be done unless the aggregate is so dry that there is no danger of caking.

21. Empty the spread hoppers.
22. Empty the receiving hopper.
23. Set the switches as follows:
 - MASTER (OFF)
 - R and L BELTS (OFF)
 - FRONT and REAR AUGER (OFF)

To transport the machine to another location, accomplish the following steps:

- A. Fully retract the spread hoppers to their minimum width.
 - B. Select the cam OFF position. (Make sure to always turn the cam off when driving the chip spreader to another location, this will save wear and tare on the cam gear boxes.
24. If the optional tow bar is used, see the instructions in SECTION 5. TOW BAR (OPTIONAL).
 25. Shut off the engine and set the parking brake.



**SECTION - 5
(OPTIONAL) TOW-BAR SETUP & USE**

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SECTION 5. TOW BAR (OPTIONAL)

WARNING: STAY OUT FROM UNDER THE TOW BAR AND CHIP SPREADER WHEN THEY ARE RAISED AND SUPPORTED BY THE HYDRAULIC LIFT CYLINDER. DEATH OR PERSONAL INJURY MAY OCCUR.

NOTE: The optional tow bar can only be used on 2-Wheel Drive models.

1. Position the tow bar on a hard, flat surface.
2. Using the “trailer” jack, disconnect the tow bar from the pickup or dump truck and lower the tow bar, raising the tires off the ground as shown in Figure 5-1.
3. Remove the tow bar tires and stow them in the tow bar (Figure 5-2).
4. Carefully drive the chip spreader up to the tow bar, centering it for attachment (Figure 5-3).

WARNING: THE CHIP SPREADER ENGINE MUST BE SHUT DOWN WHILE DISCONNECTING OR RECONNECTING HYDRAULIC HOSES. DEATH OR PERSONAL INJURY MAY OCCUR.

5. Connect the long 1/4 inch hydraulic hoses on the tow bar to the quick disconnects located on the street side of the front spread hopper. The tow bar valve controls the tow bar lift cylinder.
6. Position the wood blocks (5 in. X 8 in. X 48 in.) in front of the chip spreader as shown in Figure 5-3.
7. Raise the tow bar with the hydraulic lift cylinder as shown in Figure 5-3.
8. Carefully drive the chip spreader onto the wood blocks, keeping the tow bar centered (Figure 5-5).

NOTE: A large pry-bar is helpful in aligning the pins.

9. Adjust the pin-eye height with the lift cylinder and install the coupling pins and safety pins (Figure 5-4 and Figure 5-5).

CAUTION: DO NOT USE THE TRAILERING JACK TO RAISE THE CHIP SPREADER. DAMAGE TO THE TRAILERING JACK MAY OCCUR.

10. Raise the chip spreader and the tow bar with the hydraulic lift cylinder until the front chipper tires are at least 10 inches off the ground (Figure 5-6).

11. Adjust the pintle eye to match the towing vehicle (Figure 5-7). Torque the pintle eye bolts to 300 FT-LB.
12. Couple the tow bar to the towing vehicle.
13. Remove the wood blocks from under the chip spreader.
14. Make the air and light connections at each end of the tow bar (Figure 5-5 and Figure 5-8).
15. Change the air valve to the "Towing" position (located near the air glad-hand connection at the rear of the tow bar on the chip spreader).
16. Check the air brake operation from the towing vehicle, ensuring the rear brakes on the chip spreader function with the towing vehicle brakes.
17. Check all signal, brake and tail lights. Ensure they coordinate with the towing vehicle lights.
18. Attach the safety chains (2) to the towing vehicle (Figure 5-8 and Figure 5-9).
19. Double check the safety pins on the coupling pins at the rear of the tow bar (Figure 5-4).

Towing Requirements

<p>WARNING: FAILURE TO COMPLY WITH THE FOLLOWING MINIMUM TOWING REQUIREMENTS COULD RESULT IN ACCIDENTAL SEPARATION OF THE CHIP SPREADER FROM THE TOW VEHICLE WHILE IN TRANSIT, CAUSING A POTENTIALLY DEADLY SITUATION.</p>

20. The towing vehicle must be three axle, ten wheel (minimum) with a GVW of 52,000 lb. minimum (40,000 RAWR, 12,000 FAWR).
21. The pintle hook must be rated at 80,000 lb. towing capacity and 15,000 lb. vertical load minimum (Figure 5-8). The pintle must be mounted no more than 56 inches rear of the tandem suspensions trunion (Figure 5-9).
22. A combination hitch X-member complete with pintle and chipper hook bar can be supplied by BearCat (Part No. BRK-50960, Hitch and Hook Bar Assembly, MSC-50960 Premier 580 solid pintle coupling).

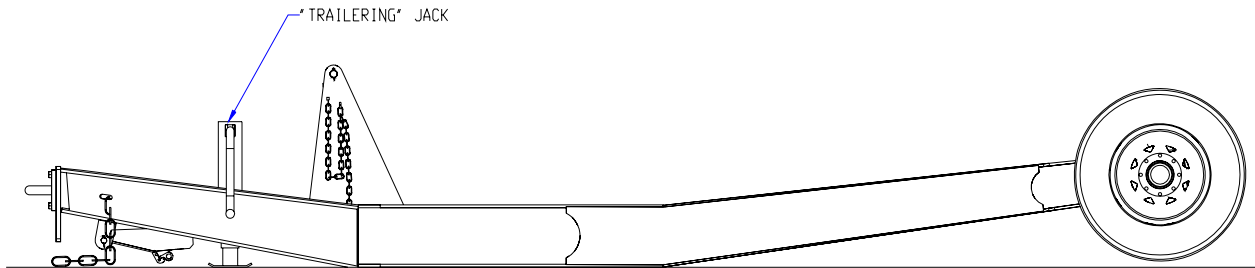


Figure 5-1. Tow Bar

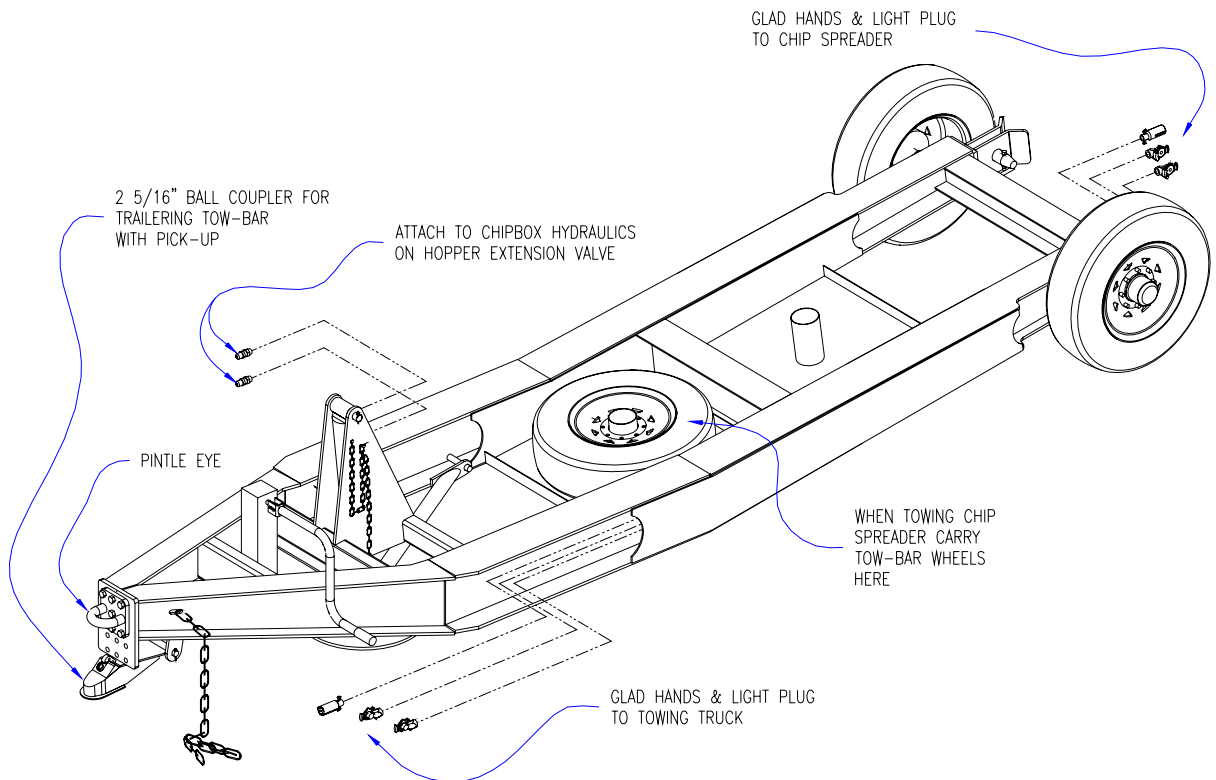
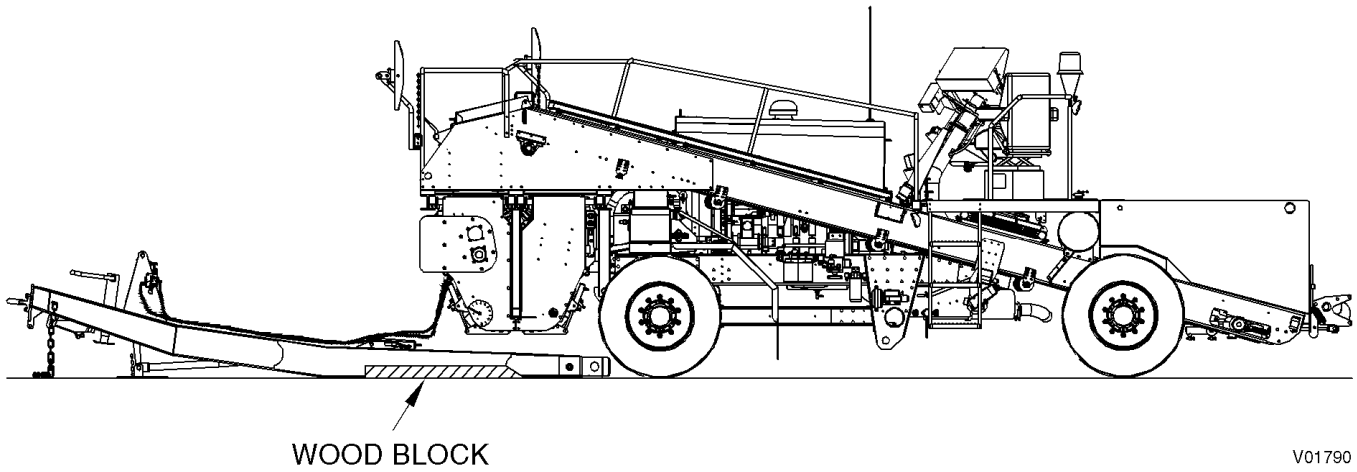


Figure 5-2. Wheel Placement and Removal Position



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Figure 5-3. Position No. 1 Loading Chip Spreader

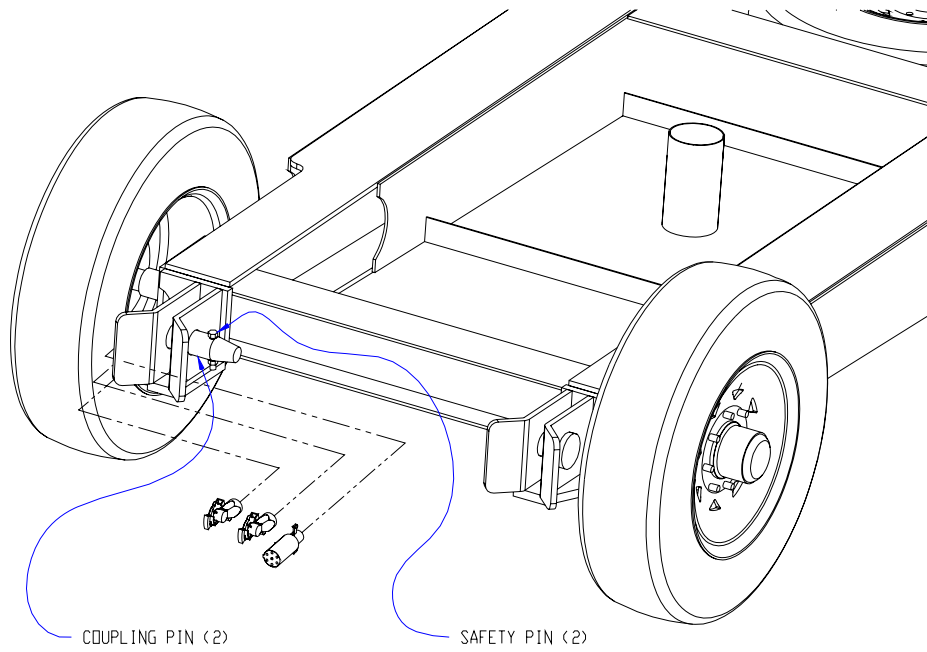
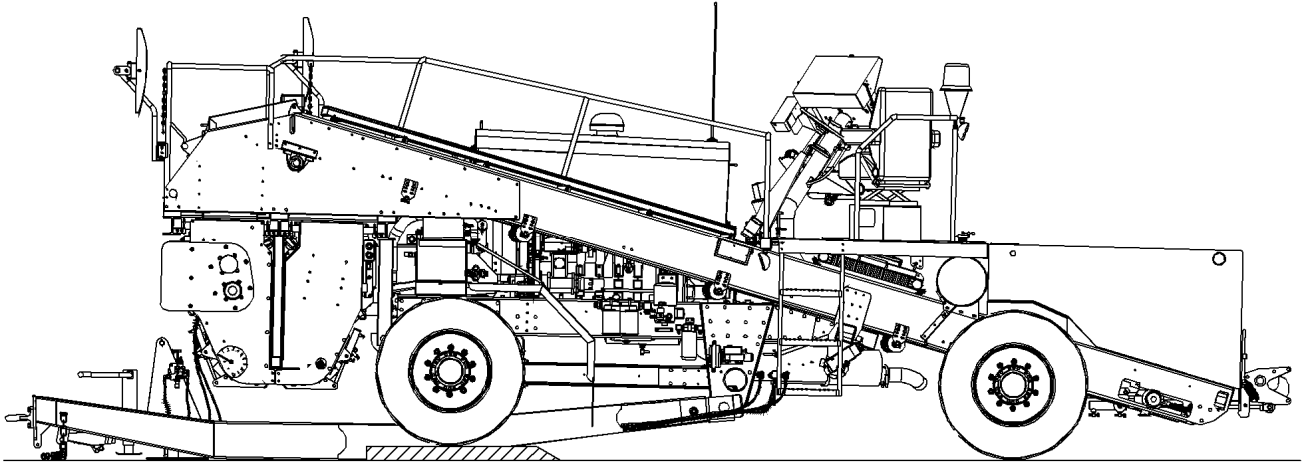
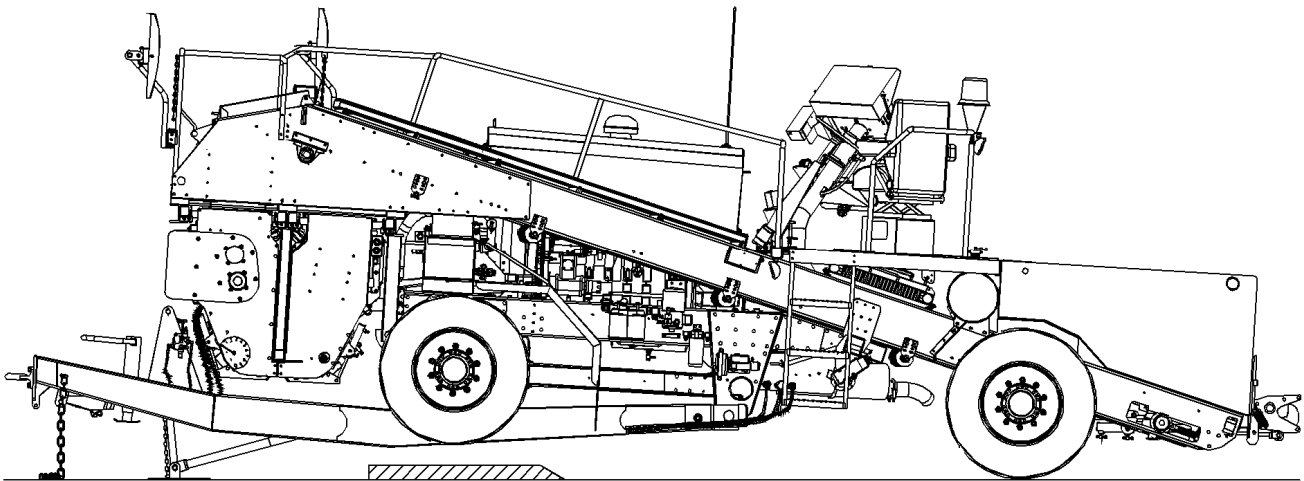


Figure 5-4. Rear View, Coupling Pins



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Figure 5-5. Position No. 2 Loading Chip Spreader



V01792

Figure 5-6. Position No. 3 Loading Chip Spreader

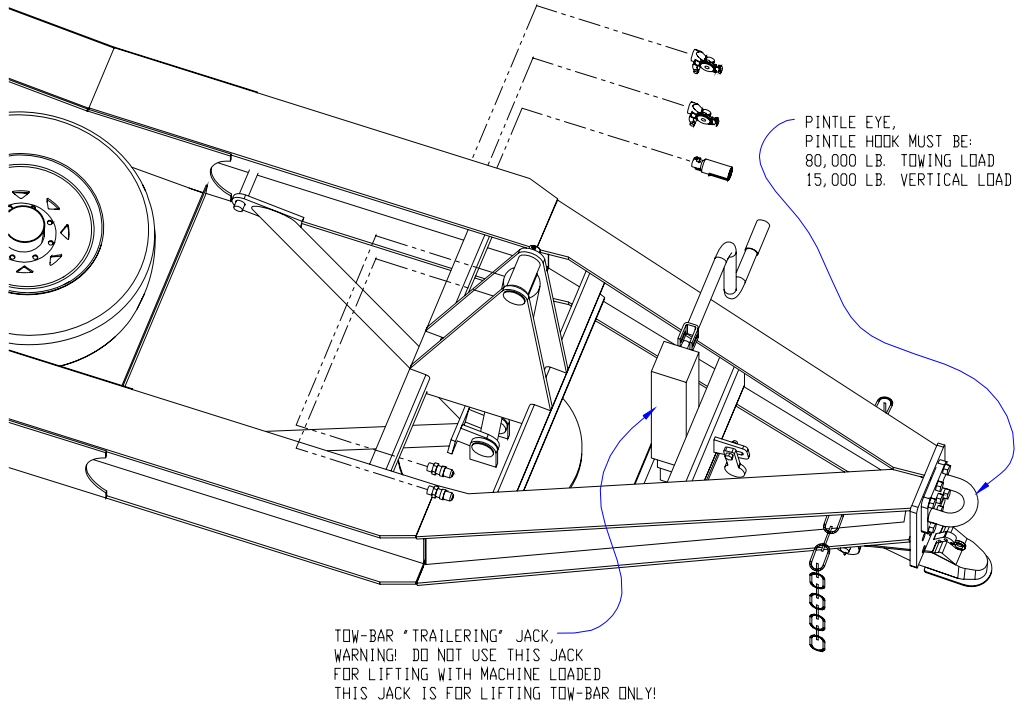


Figure 5-7. "Trailer" Jack and Pintle Eye

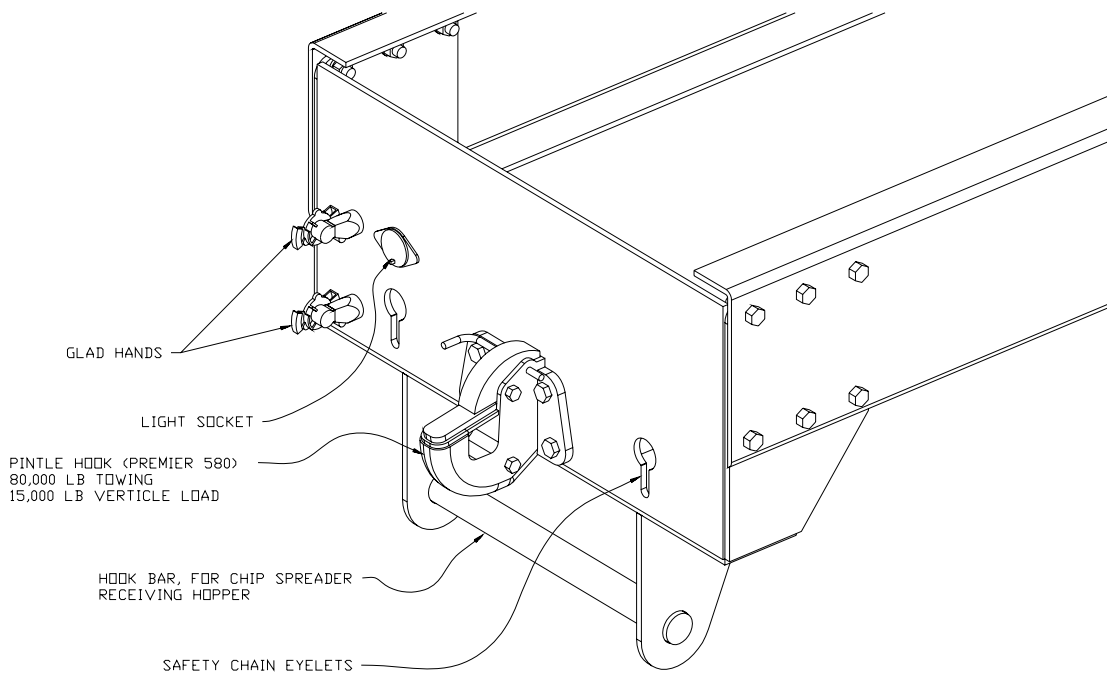
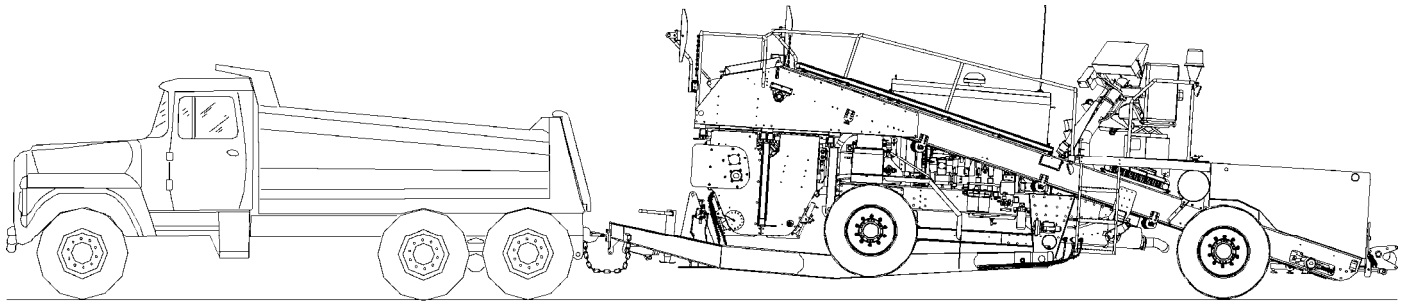


Figure 5-8. Truck Hitch and Hookups



V01793

Figure 5-9. Position No. 4 Loading Chip Spreader







**SECTION - 6
MAINTENANCE**

FIELD OPERATIONS & MAINTENANCE MANUAL

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SECTION 6. MAINTENANCE

Scheduled Maintenance

Table 6-1. Scheduled Preventive Maintenance

Period	Maintenance				
Daily	<ol style="list-style-type: none"> 1. Drain accumulated moisture from the air tanks. 2. If using pre-coated aggregate: to prevent buildup, parts of the machine exposed to the aggregate must be pre-lubricated with a suitable biodegradable solvent. These areas must be lubricated at every stop during the work shift. 				
Weekly	<ol style="list-style-type: none"> 1. Grease the four fittings per foot on the camshaft and gates (Figure 6-1). <ol style="list-style-type: none"> a. One on the shaft on each side of the gates. b. One on the bottom of the gate. c. One on the rear of the gate. 2. Grease the head bearings on the front and rear belt rollers (two fittings per roller). 				
Monthly	<ol style="list-style-type: none"> 3. Grease the rear brake' S-cam bushings (2-WD model). 4. Grease both ends of the tie rods. 5. Grease both ends of the steering cylinder. 6. Grease the top and bottom of both steering knuckles. 7. Grease both ends of the drivelines. 8. Grease the front axle yoke bearing. 9. Verify the accuracy of the gate openings: <div style="border: 2px solid black; padding: 5px; margin: 10px 0;"> <p>WARNING: TO AVOID INJURY KEEP FINGERS CLEAR OF THE GATE. SUDDEN OR UNEXPECTED MOVEMENT COULD CAUSE SERIOUS PERSONAL INJURY.</p> </div> <ol style="list-style-type: none"> a. Set switches as follows: <table style="margin-left: 20px;"> <tr> <td>ALL GATE SWITCHES</td> <td>ON</td> </tr> <tr> <td>MASTER</td> <td>ON</td> </tr> </table> b. Set the cam to the CLOSED position. c. Set any gate to a measured ½" to ¾" opening. d. Adjust remaining gates to ½" to ¾" opening, using a ½" to ¾" square tube as a feeler gauge (Figure 6-2). <ol style="list-style-type: none"> a. NOTE: the tighter you make this adjustment to more accurate you can spread smaller chips at slower speeds. 	ALL GATE SWITCHES	ON	MASTER	ON
ALL GATE SWITCHES	ON				
MASTER	ON				

	b. While spreading if one gate is spreading lighter or heavier than the other gates using the cam adjusting block adjust that gate to match the other gates.
NOTE: The grease used in all of these procedures is chassis grease.	

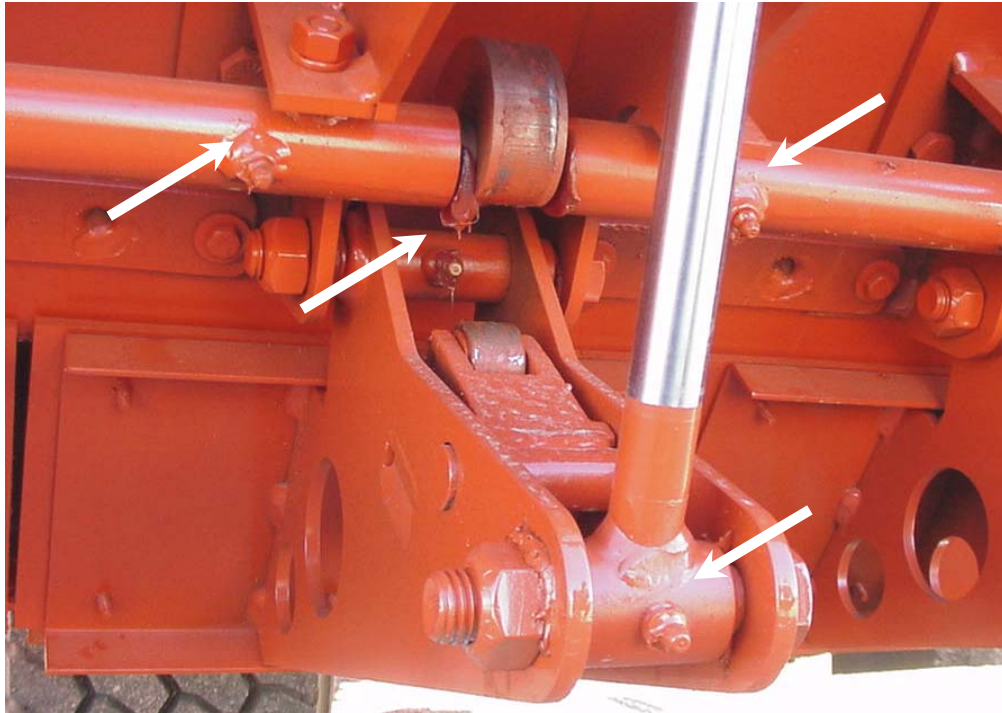


Figure 6-1. Cam Shaft and Gate Grease Fittings



Figure 6-2. Checking Gate Opening

Routine Maintenance

Weight Calibration

WARNING: POTENTIALLY LIFE-THREATENING HAZARDS MAY EXIST DURING EQUIPMENT OPERATION. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO OPERATE, SERVICE, OR MAKE ADJUSTMENTS TO THE BEARCAT EQUIPMENT.

Proper weight calibration ensures the computer controlled aggregate gates are opening to the exact extent required to deposit the specified amount of aggregate, under all operating conditions.

This procedure should be performed on a level surface and a constant speed, also the speed needs to be great enough to have the cam at least 15% to 25% open or opening to the % you will be doing your job. (Should always do your calibration with the cam 15% to 85% open)

NOTE: You should try to calibrate around the speed that you will be doing your chip spreading job.

NOTE: It is not necessary to perform the weight calibration with all gates open. Select a spread width that allows the operator to cover the canvas (4 to 6 feet).

This weight calibration should be carried out whenever the aggregate material is

changed to one of a different type or from a different source.

1. Fill the hoppers with the new aggregate.
2. Place the yard-square piece of canvas (furnished) and the scale provided and set the scale to zero.
3. Lay the canvas out flat on level ground.
4. Use the controls to enter the PSY (pounds-per-square-yard) value desired for the job.
5. Drive the chip spread around, find out what speed you need to travel to have the cam atleast 15% to 25% open or travel at the speed you will be doing your chip sealing job at.
6. On the Control Panel, position the following switches to AUTO:
R and L BELTS
FRONT and REAR AUGER
7. Drive the machine as follows:
 - A. Set the FWD-REV switch to FWD.
 - B. Give yourself plenty of distance to get moving at the required speed, press the accelerator pedal down, and get up to your required speed.

NOTE: This MUST be done on a smooth surface.

- C. Drive toward the canvas square. Position the gate switch to OPEN to begin spreading just before reaching the canvas square (the chip spreader must be traveling at the required speed for the job).
8. After passing over the canvas, position the gate switch to CLOSE and stop the machine by releasing the foot pedal.
9. Use the scale to weigh the canvas with the deposited aggregate.
10. If the actual weight differs from the value entered in Step 8, go to the CAL page PSY Correction (Figure 6-3.) use the PSY correction number to adjust the system to spread the correct amount of chips.
11. Select the PSY Correction by pressing button #1 when the background is white the PSY Correction can be edited. Use the "↑ - ↓" controls to enter the weight needed to make the chip spreader spread the required PSY (K/sM). **SEE NOTES BELOW**

NOTE: TOO HEAVY: If the actual amount of chips spread is MORE than the desired amount you will put in a negative number telling the CRC that you want LESS material.

NOTE: TOO LIGHT: If the actual amount of chips spread is LESS than the desired amount you will put in a positive number telling the CRC that you want MORE material.

12. Press & hold the OK button.

NOTE: If the difference between the entered PSY (k/sM) and the actual weight is large, a second calibration run may be necessary. If necessary, repeat Step 7 thru Step 16.

NOTE: Always run a final test after you made an adjustment to the PSY Correction.

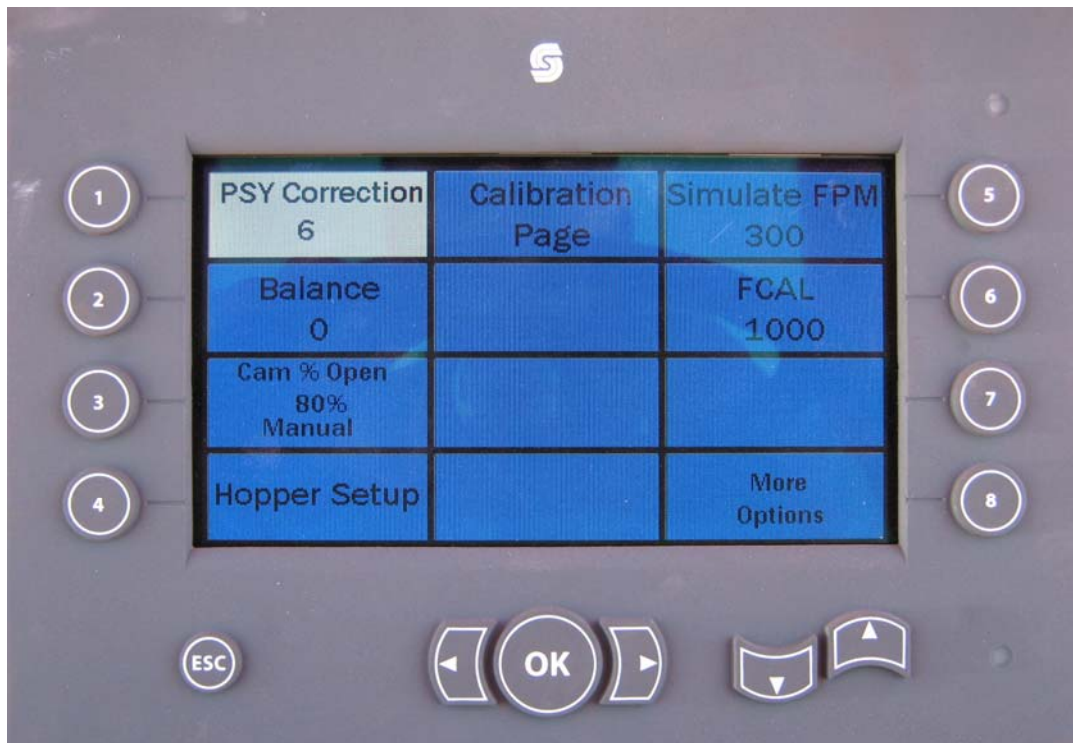


Figure 6-3. Pan Weight Cal Page

Distance Calibration

Proper distance calibration ensures the correlation between machine ground speed and chip-spreading density is accurately maintained through the distance-measuring circuits in the CRC computer.

This procedure should be performed once in each operating season. It is not necessary that the receiving hopper or spread hoppers be filled.

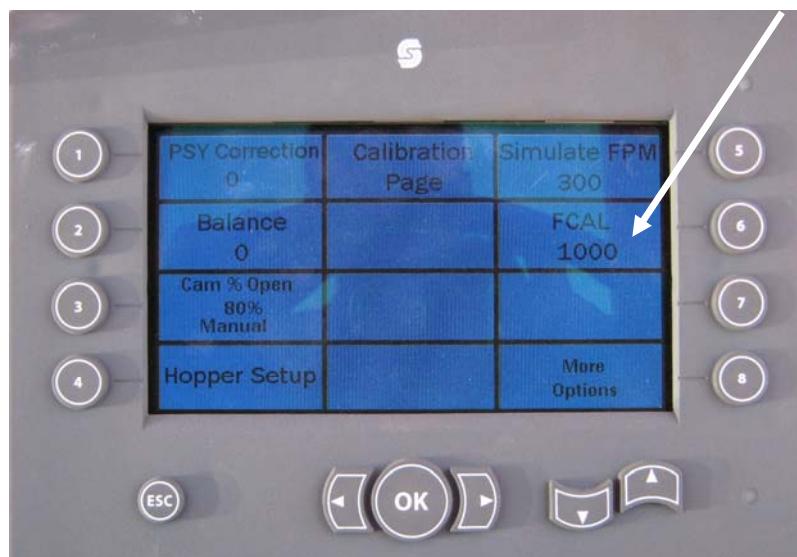
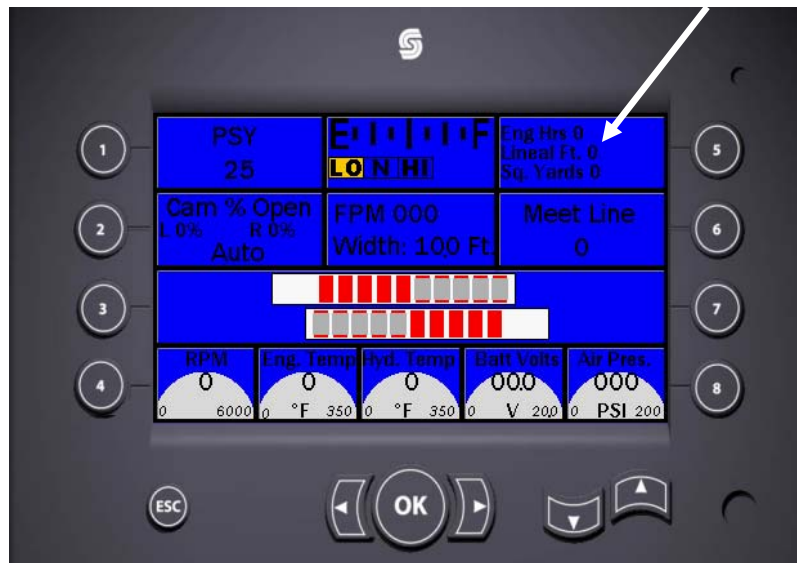


Figure 6-4. Computer Display During Distance Calibration

1. When at the front page press and hold button (#5) until the linear foot counter is resets to zero.
2. Set the FWD-REV switch to FWD, press the foot pedal until the display indicates approximately 300 FPM.
3. Turn the gate switch (Master Switch) to OPEN and drive a carefully measured distance of 1000 feet.
4. At exactly 1000 feet, position the gate switch (Master Switch) to CLOSE and stop the machine by releasing the foot pedal. The FEET display should now read approximately 1000.
5. If it doesnot display 1000, go to page two, (the calibrate page).
6. Using the select button (#6) toggle until the F-Cal value background is white.
7. Using the “increase ↑ and decrease ↓ to lower or raise the displayed FEET until it distance traveled on the front page reads 1000.
8. When the display reads 1000, press OK. The distance calibration is now complete. You can go back to the main page and use the chip spreader.
 1. Note the new distance (footage) calibration number (F-Cal) and enter it on the title page of this manual. The computer control can be reset to this number if the box is replaced or the number is changed. If this number is used, the unit will not require a complete distance calibration.

CAM Feedback Sensor Calibration-Replacement

CAM gearbox mounted sensor (2010 to current):

The cam feedback sensor is a self-calibrating hall-effect PPU type located in the CAM gearbox. It does not require any calibrating but needs to be mounted correctly. Adjustment or replacement, perform the following steps.

1. With chipper spreader engine OFF.
2. Remove: unplug connector, the PPU sensor, loosen lock-nut rotate CCW.
3. Install: using your fingers, turning CW install new PPU until the face of the PPU touches the speed ring inside the cam gearbox. **CAUTION!** Do not over tighten you will damage the PPU or speed ring.
4. Now back out CCW 1/4 turn. Continue backing out until the flats are at 22° either side of the hydraulic motor shaft center line (20° - 30° is acceptable)
 - a. DO NOT: back out more than a total of ¾ of a turn, if you do your cam will not locate correctly.
 - b. NOTE: A standard open-end wrench head angle is 22°.

5. Plug the cable in and try the cam using the manual mode set at 50% open.
 - a. If the cam goes full open and the numbers are negative.
 - b. Rotate the PPU to the opposite 22° side of the hydraulic motor shaft center line, this will change the close signal of the PPU to the opposite rotation.

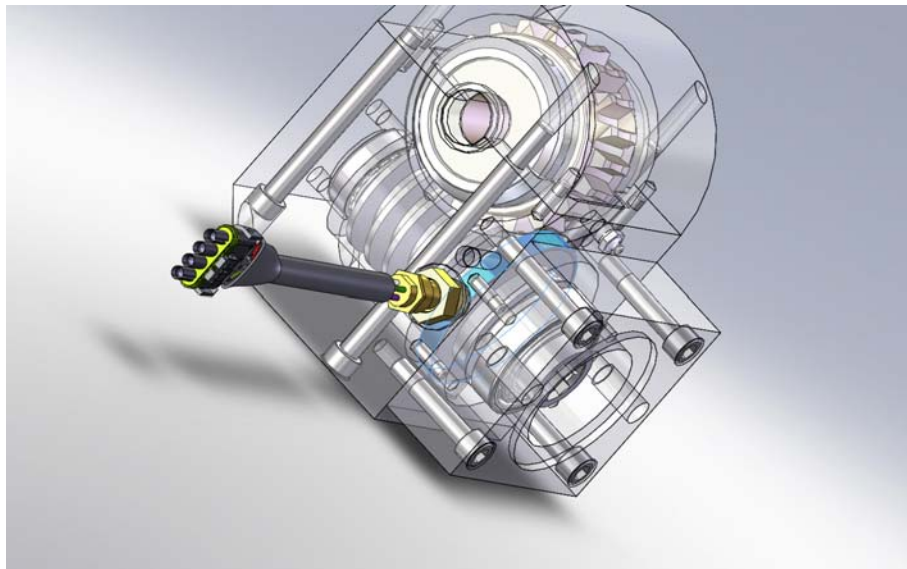


Figure 6-5. Cam Gearbox Position Sensor

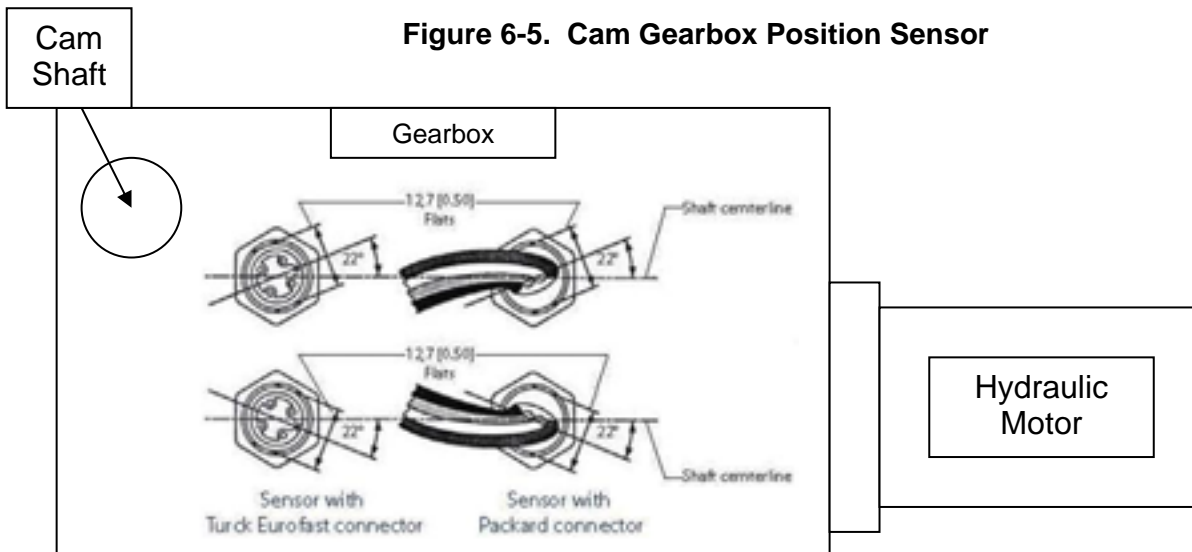


Figure 6-6. Cam Gearbox Position Sensor 22deg view

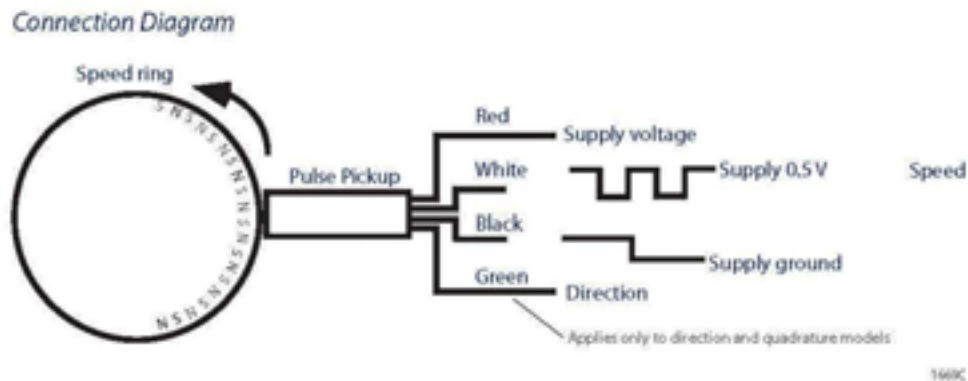


Figure 6-7. Cam Gearbox Position Sensor How it Works

Hydraulic Motor mounted sensor (mid 2008 thru 2009):

The cam feedback sensor is a self-calibrating hall-effect PPU type located in the CAM gearbox. It does not require any calibrating.

1. With chipper spreader engine OFF.
2. Remove: unplug connector, rotate the sensor CCW.
3. Install: rotate the sensor CW until the hex-shoulder bottoms tighten to 10 ft lbs.
4. Plug the cable in and try the cam using the manual mode set at 50% open.
 - a. If the cam goes full open. The CRC is not receiving the position sensor signal. See cam sensor trouble shooting.

Belt Driven Rotary Hall-sensor (mid 2005 to mid 2008):

The potentiometer (Pot) for each spread hopper is located on the outboard end of the camshaft and is protected by a heavy guard bolted to the end plate of the spread hopper (Figure 6-8). With the guard removed, the Pot can be accessed for repair or replacement (Figure 6-9). Perform the following steps to calibrate the Pot:

1. Start the chipper spreader engine.
2. Put the cam in the OFF mode.

3. With the cam in the full closed position, go the cam sensor page it should be reading about 735 and as the cam goes open the numbers should increase. If not you will need to adjust the cam sensor position by loosening the belt and rotating the cam sensor to approximately 735 and replace the belt, taking care not to rotate the sensor. Check again that as the cam opens the number increases. If it does not you will need to loosen the belt again and rotate the cam sensor 180deg.
4. With cam closed, unplug the cam sensor cable, wait for at least 5 seconds.
5. Now fully open the cam and wait at least 5 seconds, the Pot calibration is finished. It should now display 0 -100% on the display.



Figure 6-8. Cam Feedback Belt Drive Guard

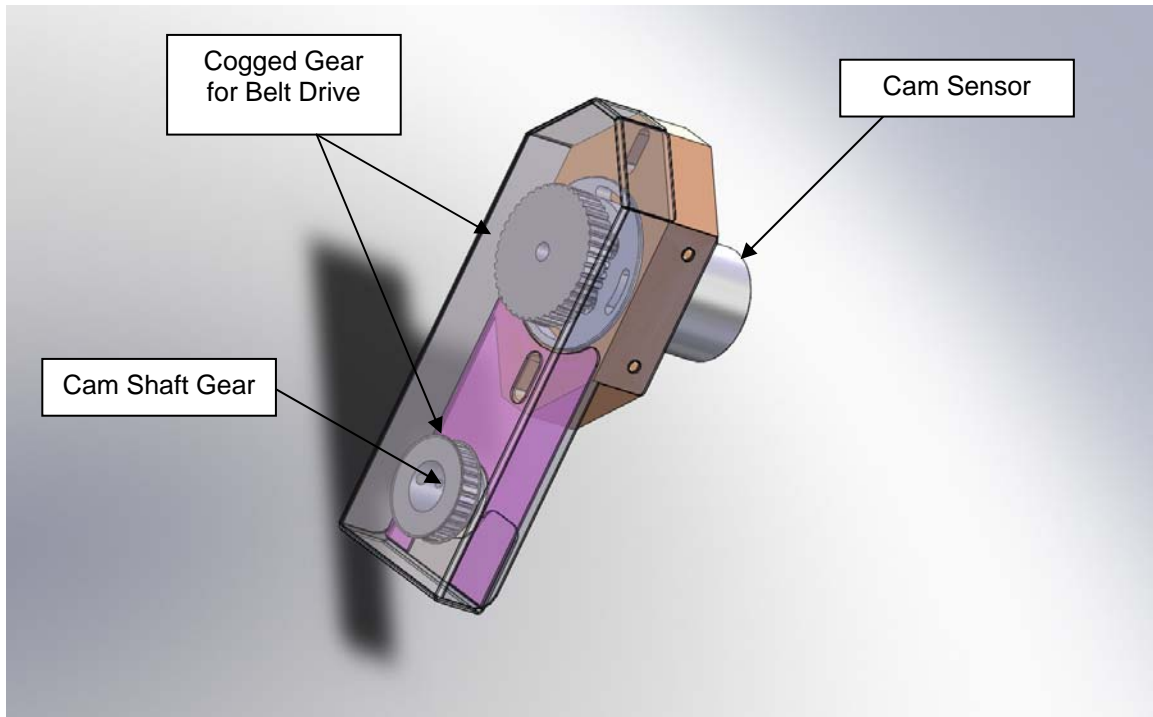


Figure 6-9. Cam Feedback Belt Drive Sensor

Replacement Filters, Belts and Misc. Items

Filters, belts and fans are not replaced during scheduled maintenance; they are replaced as needed. Table 6-2 lists BearCat's part numbers for these components and the manufacturer's part numbers.

Table 6-2. BearCat Part Numbers

Description	Brand	Part No.	BearCat Part No.	Qty
Hydraulic Components				
Hydraulic Filters				
Hydraulic Filter (100 Mesh)	Zinga	SE-100	FTR-22505	2
Hydraulic Filter (10 Micron)	Zinga	SE-10	FTR-22502	3
Hyd/Aqua Filter (10 Micron 15 GPM)	Zinga	AE-10	FTR-51736	1
Hydrostat Charge Pressure	Donaldson	P173737	FTR-1000071	1
Hydraulic Tank Pressure Cap				1
Cummins Engine Filters, Belt and Fan				
Oil Filters				
Oil Filter	Fleet Guard	LF3970	FTR-53561	1
Fuel Filters				
Fuel Filter (Primary)	Fleet Guard	FF-5421	FTR-54018	1
Pre-Fuel Filter	Fleet Guard	FS-1242	FTR-54015	1
Water Filter				
Water Filter (Service)	Fleet Guard			1
Air Filter				
Air Filter (Primary)	Fleet Guard	AF-1828	FTR-54012	1
Air Filter (Secondary)	Fleet Guard	AF-1894-M	FTR-54013	1
Belts				
Fan Belt	Cummins			1
Fan (Puller)				
	Kysair			1
Air Dryer Filter				
	Rockwell-Waboc	9628-R950011	FTR-60591	1

Lubrication Specifications

The following list references the various types of lubricants that BearCat specifies for use on specific components of the BC SuperChipper Tandem Series Chip Spreader.

Chassis Grease

- Gate Cylinder Ends
- Cam Bearings
- Gate Hinge Pins
- Head Pulley Bearings
- Auger Bearings
- Cam Lock Pivots
- Driveline (belt pump)
- Front and Rear Driveline (rear driveline 4-WD only)
- Trunion Bearing
- Take-Up Bearings (rear of conveyor)
- Spindle Bearings (top and bottom of axle)
- Tie Rod Ends

Cam Gear Box

Shell OMALA HD 460

Synthetic: (SHP-00384) OIL GEAR SYN AMSOIL RC 460 CAM GEAR BOX

Hydraulic Oil

*Shell Tellus T 100

*Texaco Rando HDZ 100

*NOTE: All Petroleum base hydraulic oil must be ISO 100 grade.

Synthetic: (SHP-00381) OIL HYD SYNTHETIC AMSOIL AWJ 68 TYP*

Front Drive Axle Gear Oil, Must meet API GL-5 and MIL-PRF 2105 SPECIFICATIONS

Shell Spirax EP 85W-140

Texaco Multigear EP 85W-140

Synthetic: (SHP-00382) OIL GEAR SYN AMSOIL Severe Gear 75W-140

4X4 Rear Drive Axle Gear Oil, Must meet API GL-5 and MIL-PRF 2105 SPECIFICATIONS

Shell Spirax EP 85W-140

Texaco Multigear EP 85W-140

Synthetic: (SHP-00382) OIL GEAR SYN AMSOIL Severe Gear 75W-140

4X4 Rear Drive Axle Gearbox Oil

Shell DONAX TG

DEXRON III

Engine Oil

Shell Rotella T 15W40 Diesel Oil

Delo 400 15W40 Diesel Oil

Synthetic: (SHP-00356) ENGINE OIL SYNTHETIC AMSOIL 15W-40*

Transfer Case

Shell DONAX TD

Texaco TDH Oil

Synthetic: (SHP-00383) OIL TRANSMISSION(FUNK)SYN AMSOIL ATH TYP

Coolant

Texaco Extended Life Anti-freeze/Coolant



SECTION - 7
SUB-ASSEMBLY FIGURES
FIELD OPERATIONS & MAINTENANCE MANUAL
MODEL BC-2002/CRC TANDEM/CHIP SPREADER
2008 TO 2010 MANUAL VERSION 1.0
SINGLE SEAT OPERATOR STATION
WITH A PLUS-1 CRC SYSTEM

LOOK FOR THIS SECTION IN FUTURE RELEASES

SECTION 7. ILLUSTRATED PARTS LIST ERROR! BOOKMARK NOT DEFINED.



**SECTION - 8
SCHEMATICS**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

2008 TO 2010 MANUAL VERSION 1.0

**SINGLE SEAT OPERATOR STATION
WITH A PLUS-1 CRC SYSTEM**

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SECTION 8. DIAGRAMS

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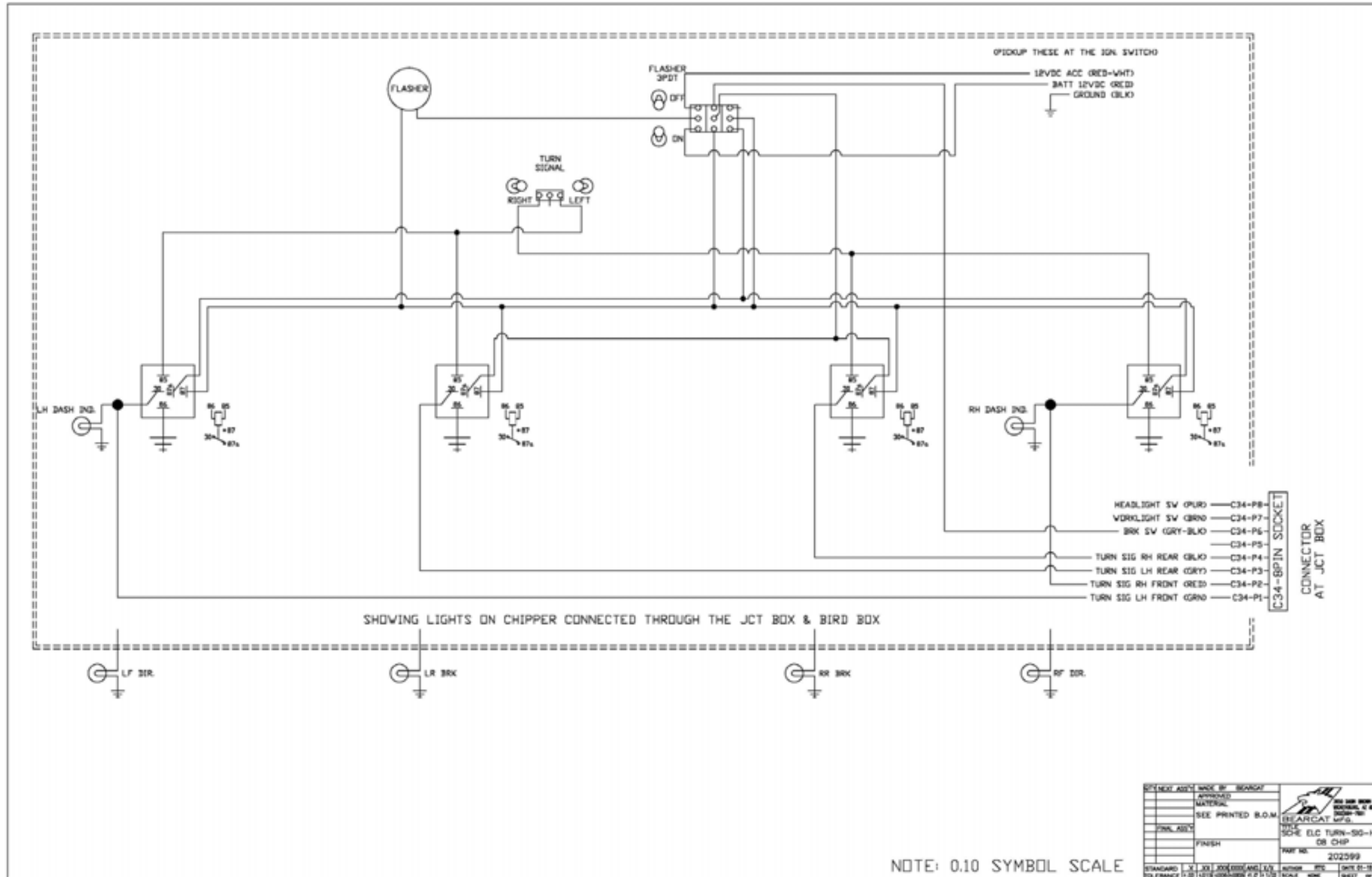


Figure 8-2. Console Wiring Directional/Flasher, Tandem/Standard (2008 - Current)

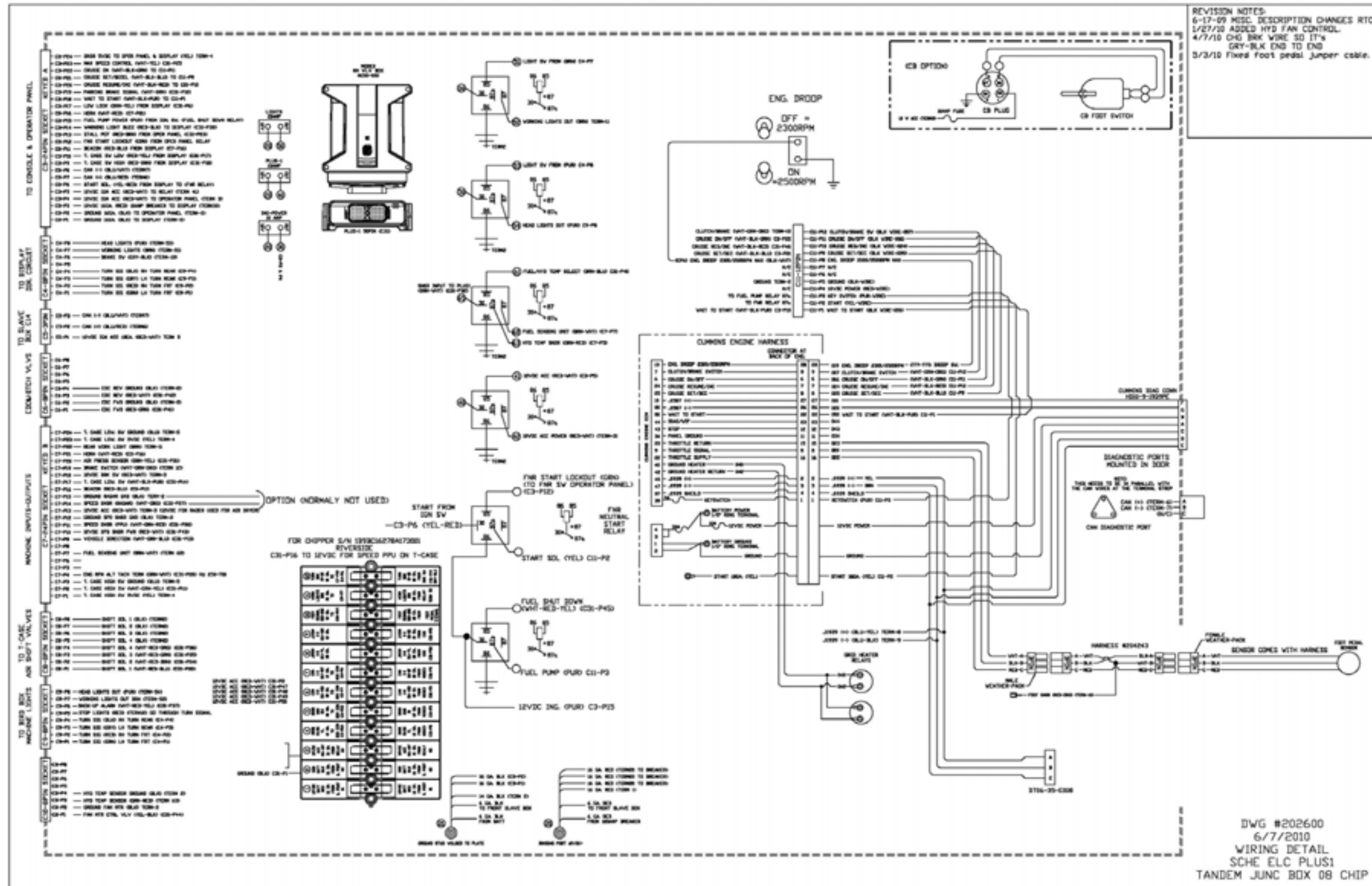


Figure 8-4. Junction Box Wiring Detail, Tandem (2008 – Current)

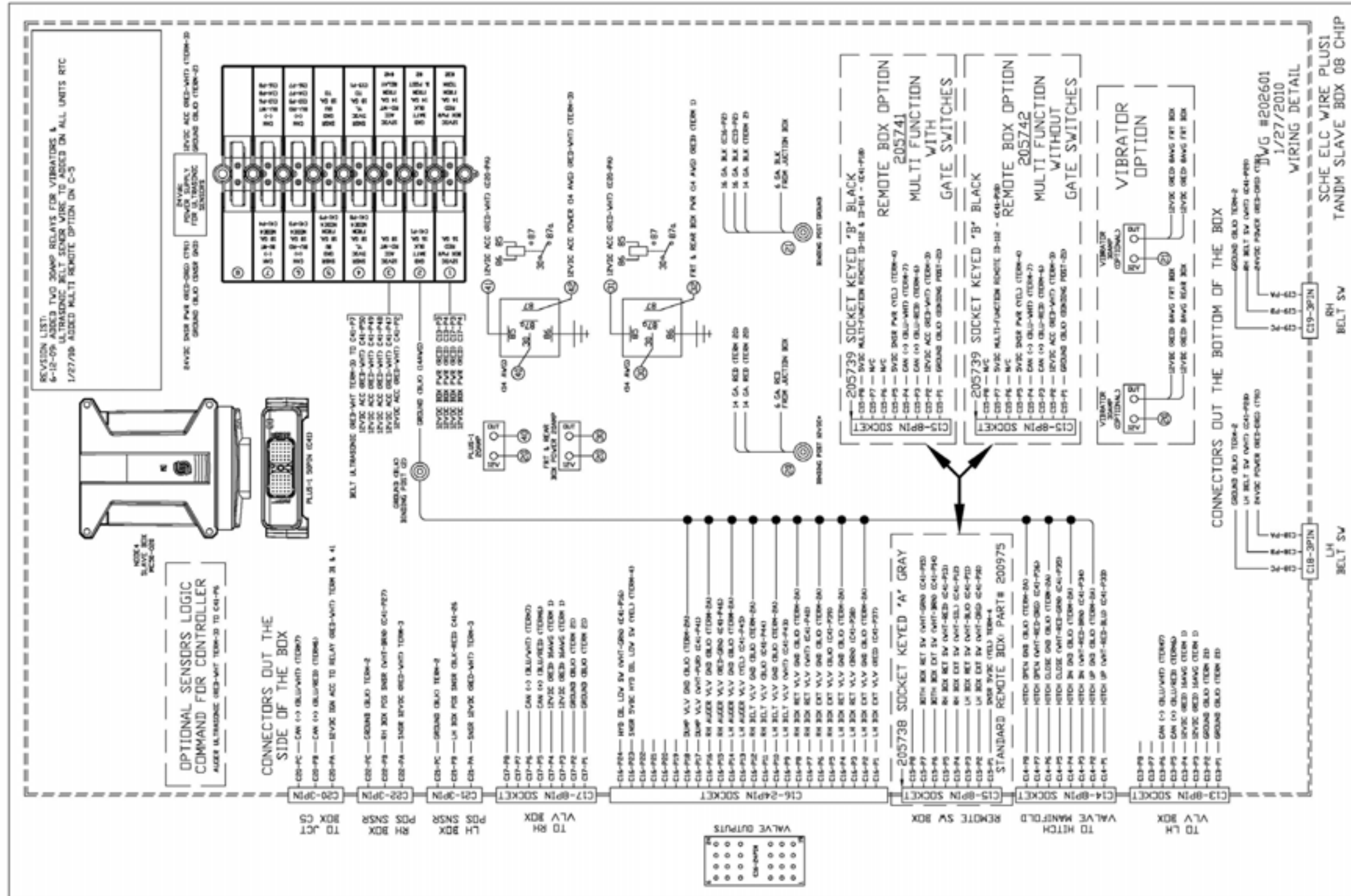


Figure 8-5. Slave Box Wiring Detail, Tandem (2008 – Current)

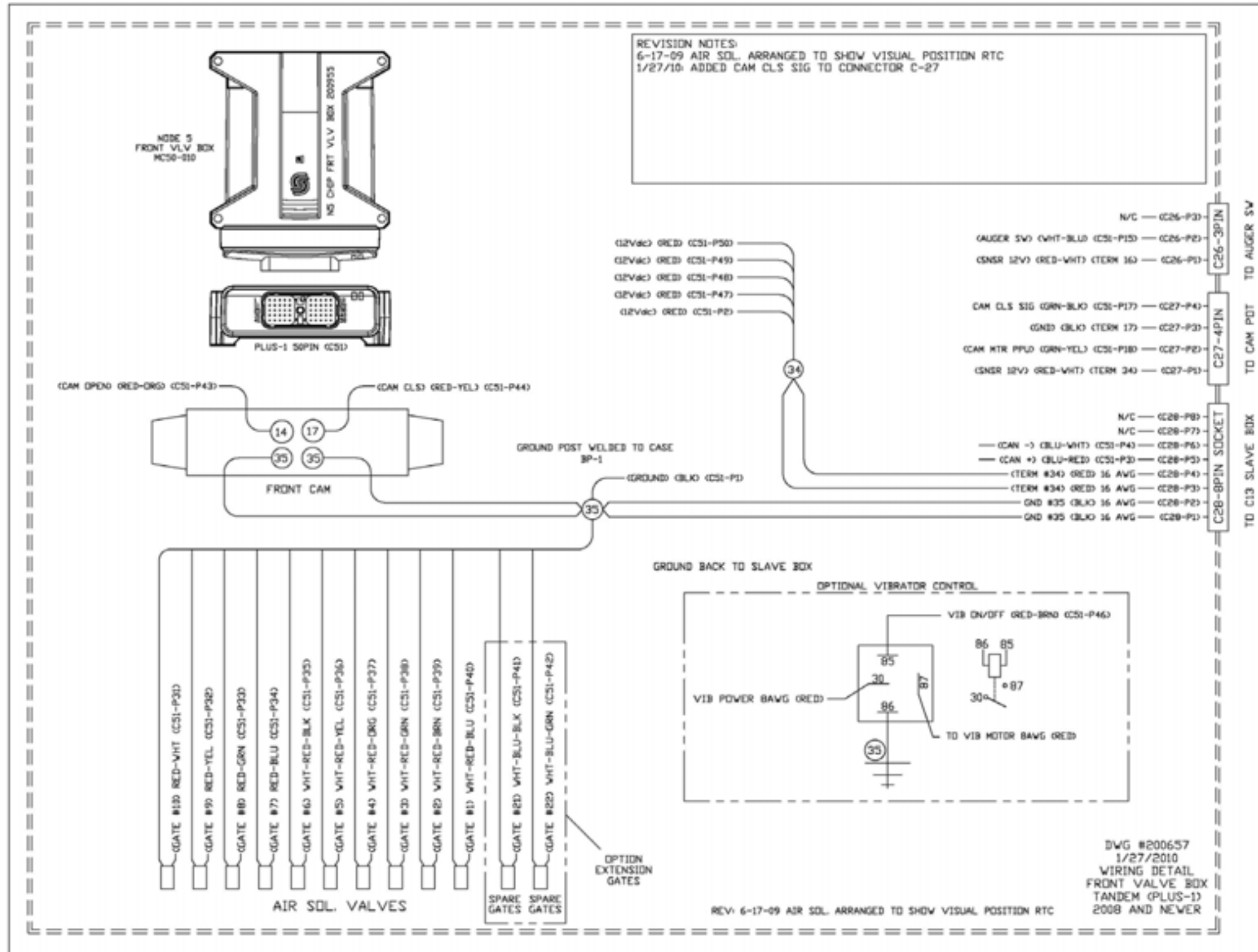


Figure 8-6. Valve Box Wiring Detail Left (Front), Tandem (2008 – Current)

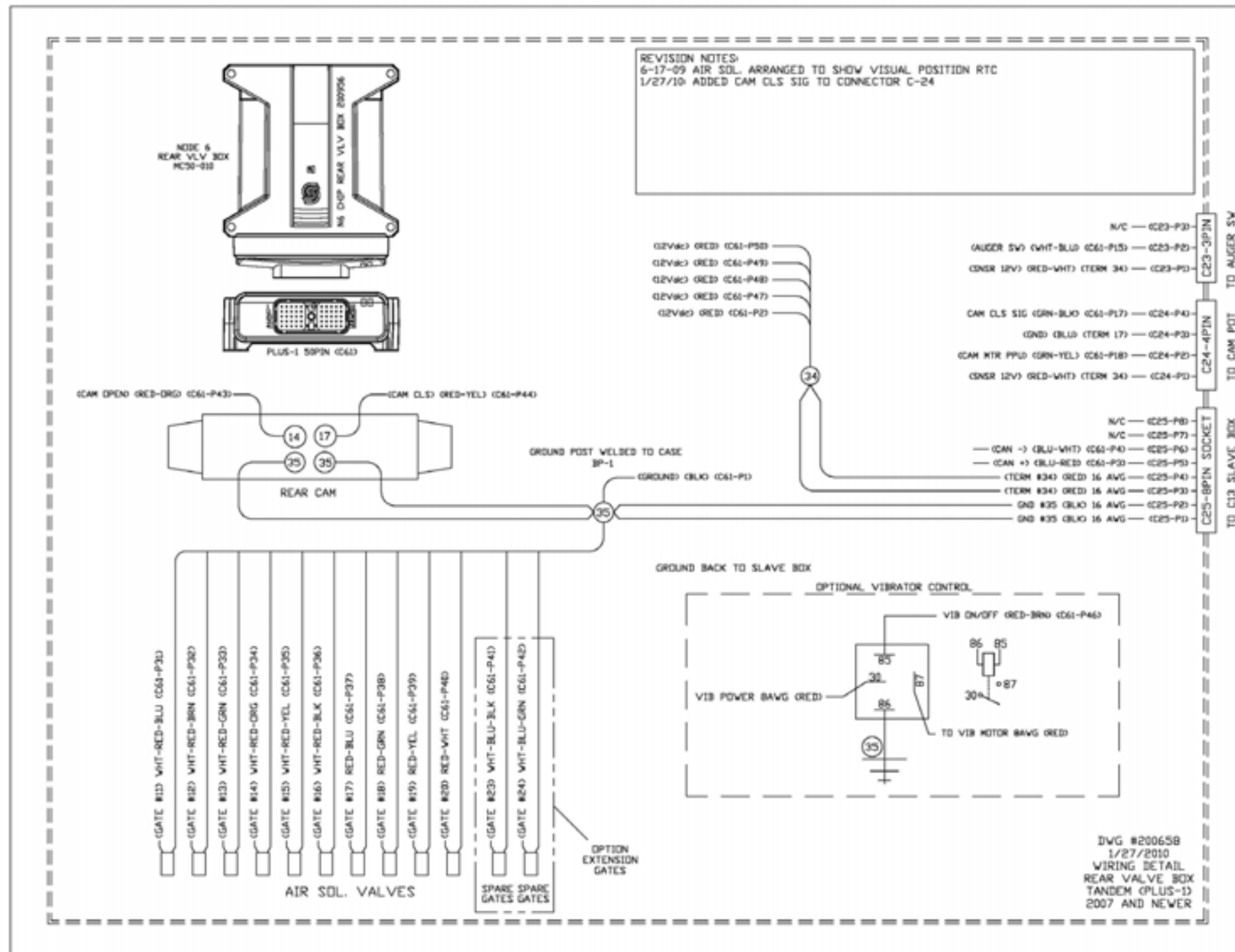


Figure 8-7 Valve Box Wiring Detail Right (Rear), Tandem (2008 – Current)

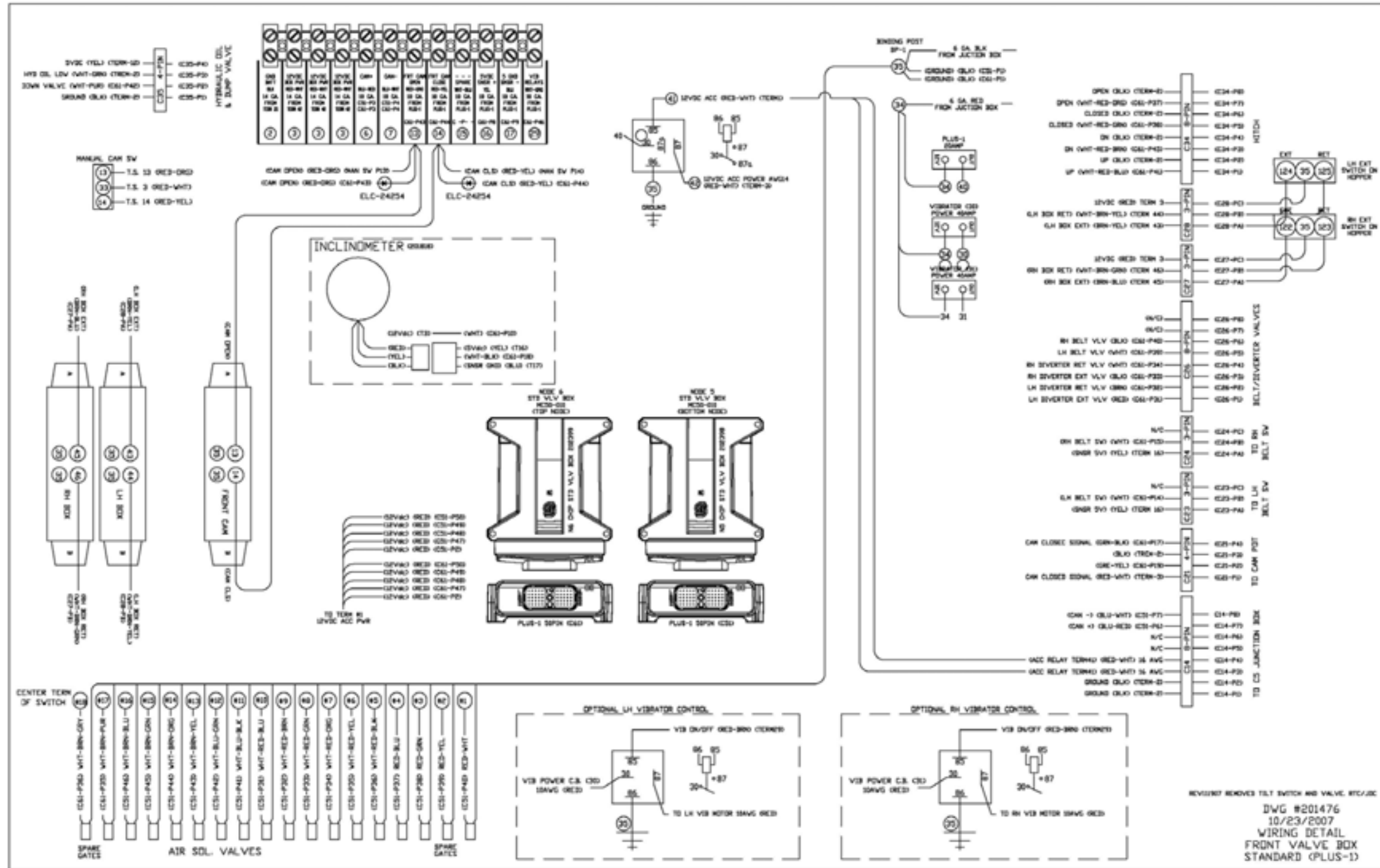


Figure 8-6 Valve Box STANDARD CHIPPER (2008 – Current)

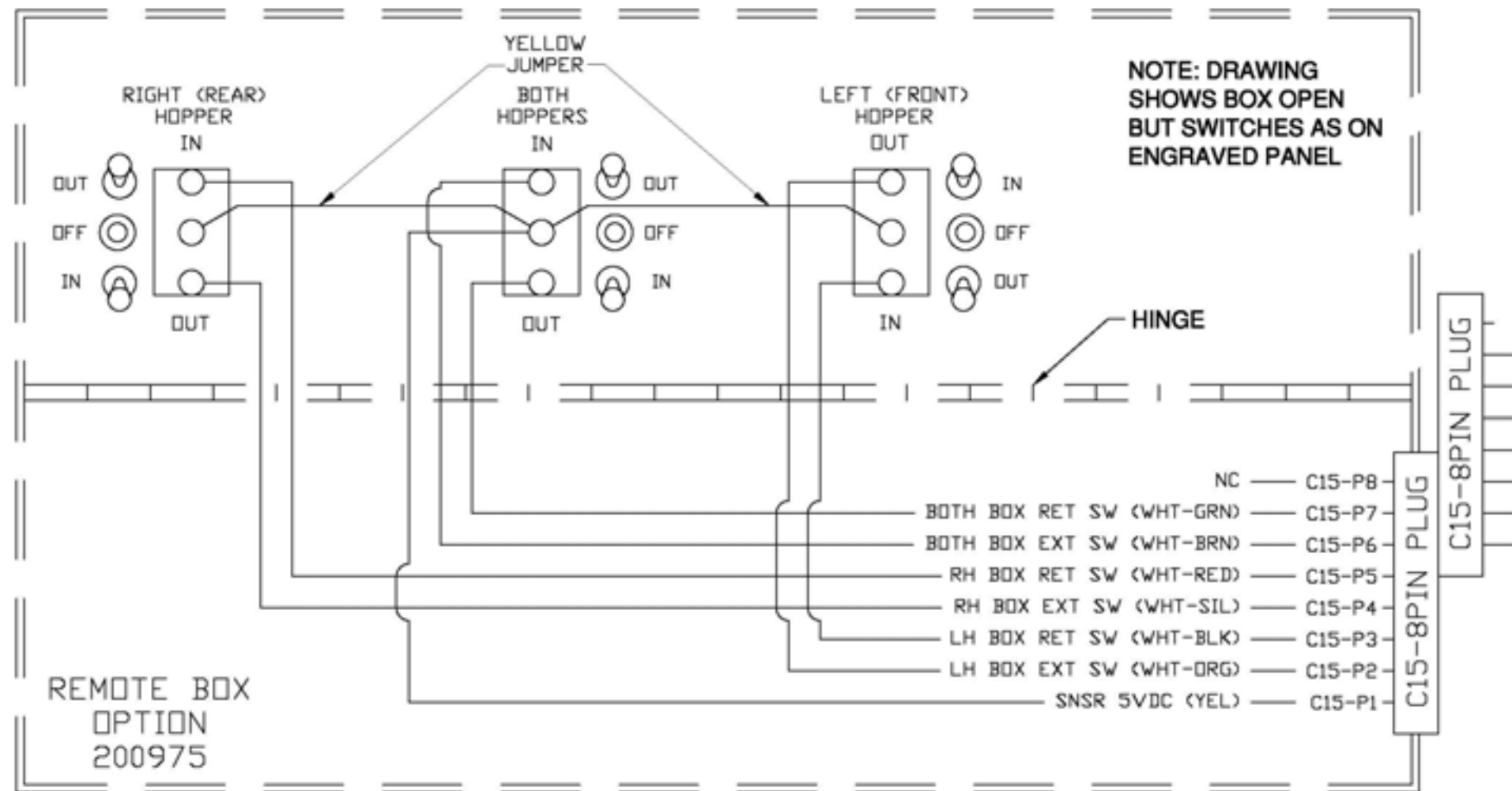


Figure 8-8. Remote (Optional) Box Wiring Detail, Tandem (2006 – Current)

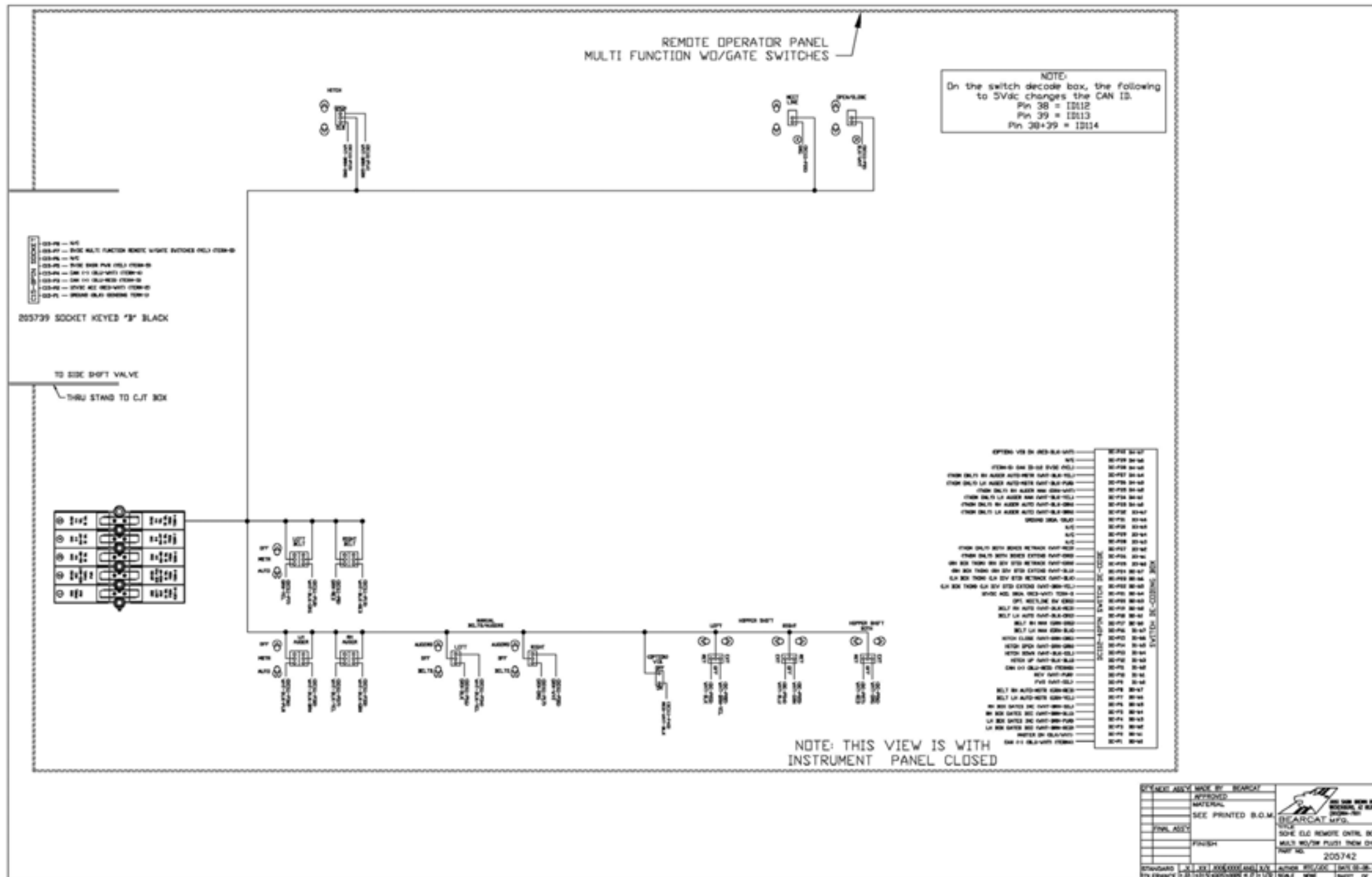


Figure 8-9. Remote (Opt. Mult. w/o) Box Wiring Detail, Tandem (2008 – Current)

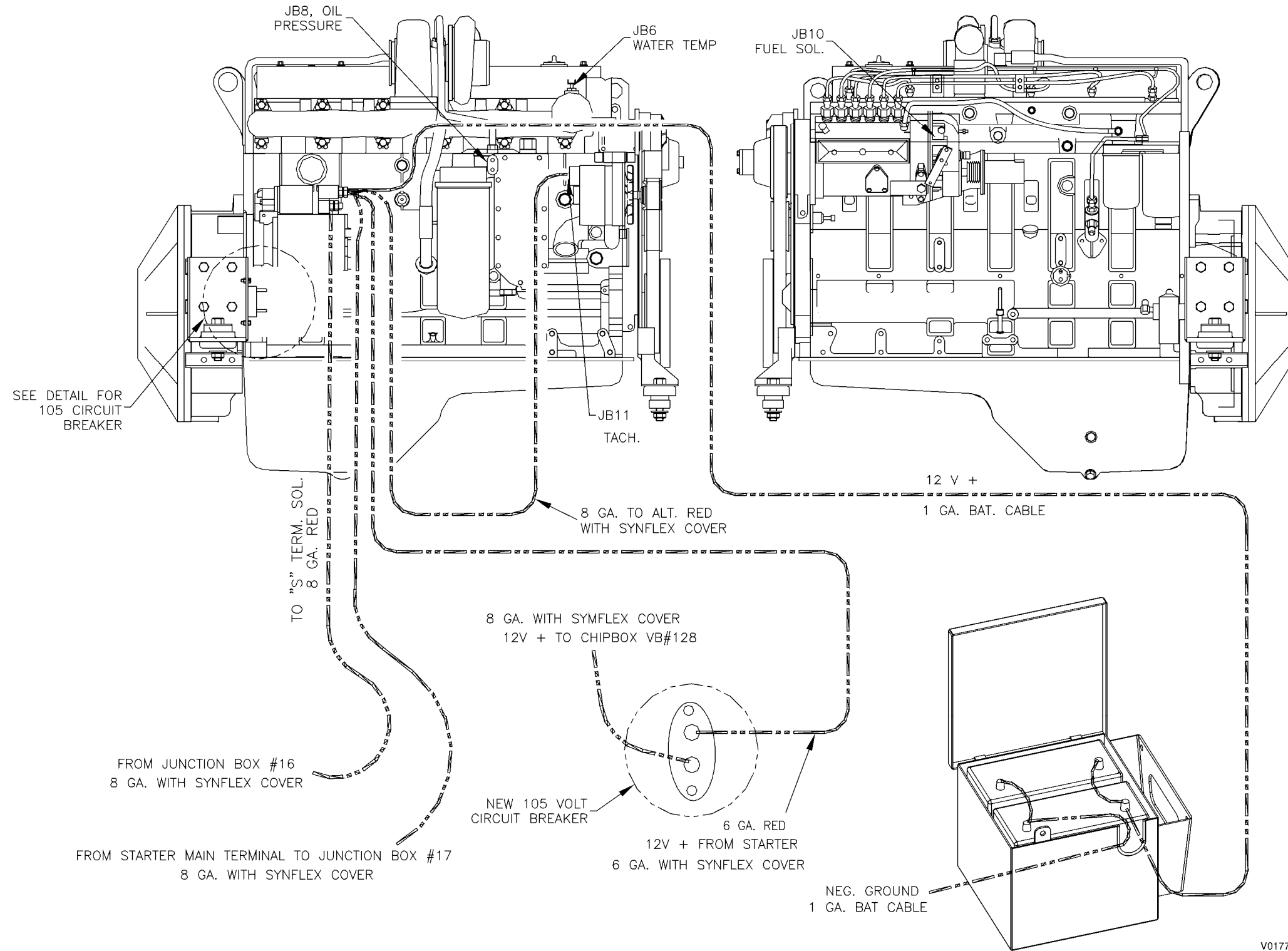


Figure 8-11. Engine Wiring Detail Battery Cables

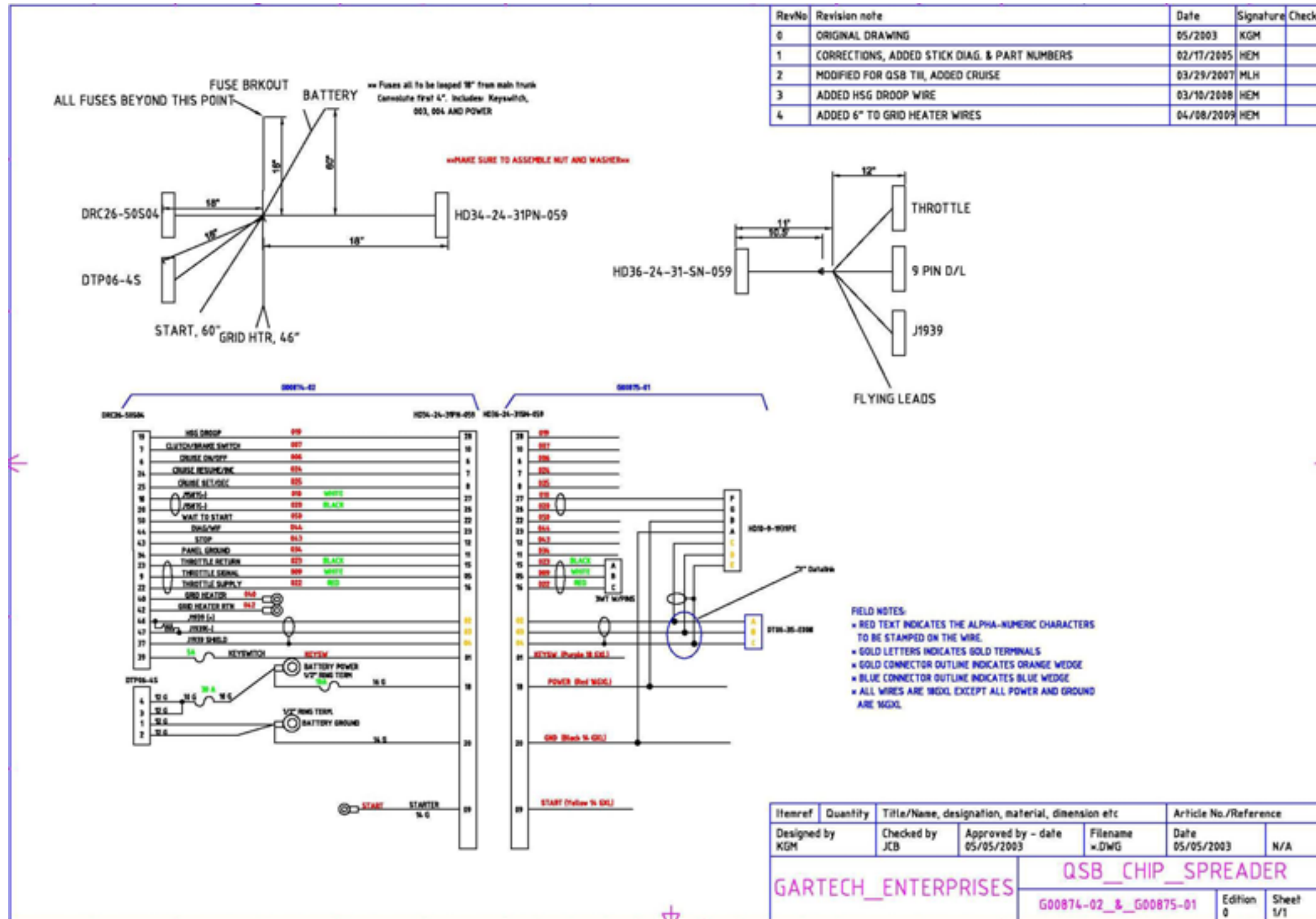
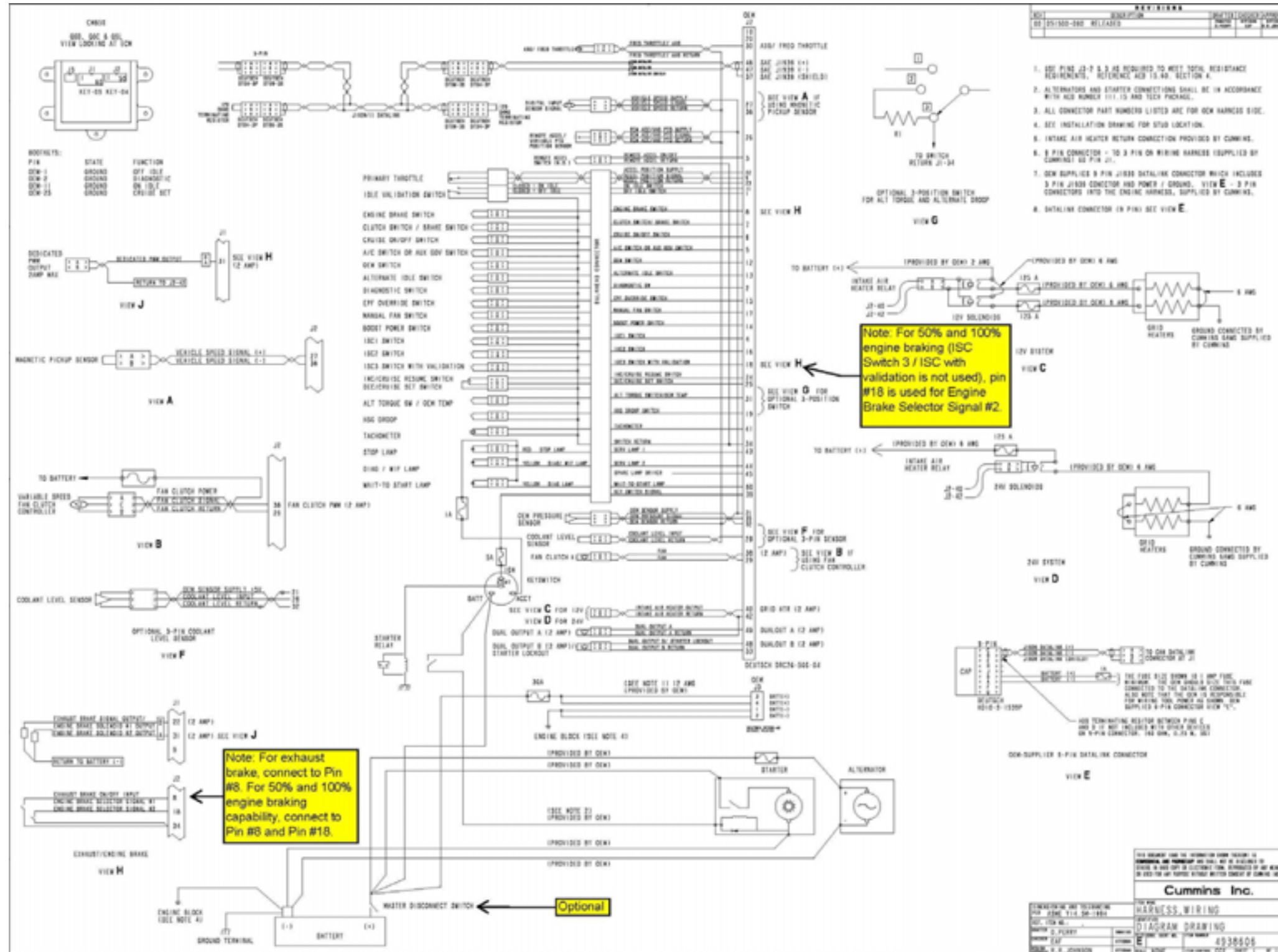


Figure 8-12. Engine Wiring Detail (1 of 2) 6.7L Tier-3



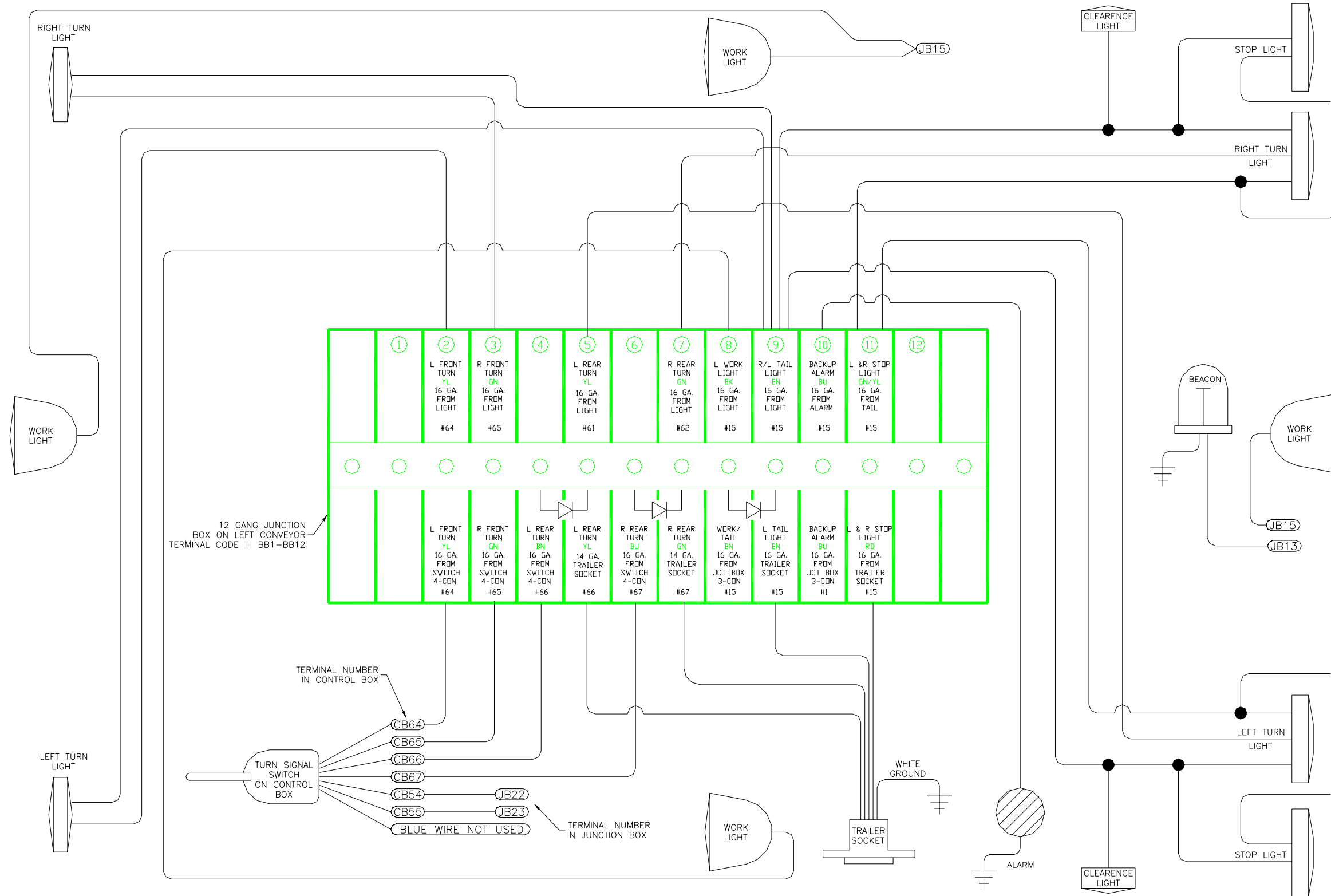


Figure 8-14. Lights Wiring Detail

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
1	16	WT-BK-GN	CB1 to JB1 (back-up alarm)
1	16	BU	JB1 to BB10 (back-up alarm)
1	16	BU	BB10 to back-up alarm
1	16	BU	BB10 to back-up alarm
2	16	WT-BK-YL	CB2 from left belt switch (middle term)
2	16	WT-BK-YL	CB2 to JB2 (left conveyor)
2	16	YL	JB2 to left conveyor solenoid
3	16	WT-BN	CB3 from right belt switch (middle term)
3	16	WT-BN	CB3 to JB3 (right conveyor)
3	16	GN	JB3 to right conveyor solenoid
4	16	WT-SL	CB4 from hitch switch (top term)
4	16	WT-SL	CB4 to JB4 (hitch open)
4	16	WT	JB4 to hitch control valve
5	16	WT-BK-SL	CB5 from hitch switch (bottom term)
5	16	WT-BK-SL	CB5 to JB5 (hitch closed)
5	16	BK	JB5 to hitch control valve
6	16	WT-BU-BN	CB6 from water temp gauge (S-term)
6	16	WT-BU-BN	CB6 to JB6 (water temp)
6	14	YL	JB6 to water temp sensor on engine
7	16	WT-OR	CB7 from hydraulic oil temp gauge (S-term)
7	16	WT-OR	CB7 to JB7 (hydraulic oil temp)
7	16	WT	JB7 to hydraulic oil temp sensor
8	16	WT-BK	CB8 from oil pressure gauge (S-term)
8	16	WT-BK	CB8 to JB8 (engine oil pressure)
8	14	BU	JB8 to engine oil pressure sensor
9	16	WT-BN-PU	CB9 from fuel gauge (S-term)
9	16	WT-BN-PU	CB9 to JB9 (fuel gauge)
9	16	OR	JB9 to fuel gauge
10	16	RN-GN	CB10 from circuit breaker
10	16	RN-GN	Right term 30 A circuit breaker to right term 15 A circuit breaker
10	16	RD-GN	CB10 to JB10 to #7 term of relay (jumper to #8, #1 relay)
10	14	RD	Relay term #5 to fuel pump solenoid (jumper to term #4 relay)
11	16	RD-BK	CB11 from tach (bottom left term)
11	16	RD-BK	CB11 to JB11 (tach)
11	14	BK	JB11 to tach (off alternator)
12	16	WT-BK-BU	CB12 from horn switch (right term)
12	16	WT-BK-BU	CB12 to JB12 (horn)

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
12	14	BN	JB12 to RB (remote shift barrier strip) #1 term
13	16	WT-RD	CB13 from beacon switch (top right term) to beacon switch (bottom right term)
13	16	WT-RD	CB13 to JB13 (beacon)
13	14	WT	JB13 to beacon light
14	16	WT-BK-OR	CB14 temp light & buzzer
14	16	WT-BK-OR	CB14 to JB14 to term #2 relay (WT-BN-RD) to over-temp lights on console
14	14	OR	JB14 to sensor (on oil cooler)
15	12	RD	CB15 to light switch and to gauge lights
15	12	RD	CB15 to JB15 (work & tail lights)
15	16	BK	JB15 to front work light
15	16	BK	JB15 to right work light
15	16	BK	JB15 to rear work light
15	14	BK	JB15 to BB8
15	14	BK	BB8 to left work light
15	Diode		BB8 to BB9
15	14	BN	BB9 to left tail light
15	14	BN	BB9 to right tail light
16	12	RD-WT	Ignition switch (start term) to relay (term #4 & #5) from relay term (#1 & #8) to CB16s
16	12	RD-WT	CB16 to JB16 (starter solenoid)
16	12	RD-WT	JB16 to starter solenoid
17	12	Y1	CB17 to ignition switch (battery term)
17	12	Y1	CB17 to JB17 (starter post main +12V)
17	10	RD	JB17 to starter post (main +12V term)
17	8	RD	Starter post to battery (+12V term)
17	8	RD	Battery (+ term) to alternator (+12V term)
18	12	OR	CB18 from ignition switch (acc term)
18	12	OR	CB18 to JB18 (ignition acc)
18	12	RD	JB18 to 15 A (battery term) breaker
18	12	RD	(Aux term) 15 A breaker to JB19 to air dryer
19	14	RD	JB18 to air brake switch
19	16	WT	CB19 to #2 term potentiometer port #7 amplifier (input)
19	16	WT (from 3-cond.)	CB19 to digital foot pedal
20	16	RD	CB20 to #3 term potentiometer port #6 amplifier (+8V reg)
21	16	WT	CB21 to center term digital foot pedal
22	16	RD	CB22 from forward and reverse switch (bottom middle term) to CB22

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
22	16	RD	CB22 to E.D.C. plug (on hydrostatic trans)
23	16	BK	CB23 to forward and reverse switch (center term) to CB23
23	16	BK	CB23 to E.D.C. plug (on hydrostatic trans)
24	16	WT-BK-OR	CB24 to buzzer & water temperature light
24	16	WT-RD-OR	CB24 to JB24
24	12	GN	JB24 to hydraulic temperature sensor
25	16	BN	CB24 to buzzer and oil light
25	14	BN	CB24 to JB24
25	14	BN	JB24 to oil sending sensor
26	16	PU	CB26 to rear auger switch (bottom term auto)
26	16	PU	CB26 to SB15 (in 19-cond. Cable from slave box on right-hand conveyor)
26	16	WT-SL	SB15 to (rear) VB12 (19-cond.)
26	16	RD	VB12 to rear auger proximity switch (2-cond.)
26	16	BN	Proximity switch (rear) VB11 (2-cond.)
26	16	WT-OR	VB11 to SB14 (19-cond.)
27	16	GN	CB27 to rear auger switch (top term manual)
27	16	YL	CB27 to SB23 (19-cond.)
27	16	YL	SBA23 to rear auger solenoid valve (4-cond.)
28	16	SL	CB28 to breaker (right-hand term)
28	16	SL	CB28 to SB11 (19-cond.)
28	16	SL	SB11 to valve box power relay ¼" term #86
28	16	BK	¼" term #85 valve box power relay to ground
29	16	YL	CB29 to front auger switch (top term manual)
29	16	YL	CB29 to SB24 (19-cond.)
29	16	YL	SB24 to front auger solenoid valve (4-cond.)
30	16	BU	CB30 to front auger switch (bottom term auto)
30	16	BU	CB30 to SB12 (19-cond.)
30	16	WT-BK-YL	SB12 (19-cond.) to VB11
30	16	RD	VB11 to front auger proximity switch (2-cond.)
30	16	BN	Proximity switch (front) VB12 (2-cond.)
30	16	WT	VB12 to SB13 (19-cond.)
31	16	WT-BK-GN	CB31 to amplifier port #4 (valve +) to forward/reverse switch
31	16	PU	Top center term to bottom lower term of switch
32	12	RD	CB32 to master switch (top left-hand term) to master switch (top right-hand term)
32	12	RD	CB32 to SB binding post (19-cond.)
32	12	RD	SB32 binding post to 70 A relay 3/8" term valve box power

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
32	12	RD	Valve box power relay 3/8" term to main binding power post
32	12	RD	Computer power relay 1/4" term and 3/8" term to SB binding post
32	14	RD	From 3/8" term computer power relay to 12-pin connector slave L pin
32	12	RD	From SB binding post to SB4 jumper SB4, SB3, SB2, jumper wire to SB13 jump to SB14, jumper wire to SB18 and jumper to SB19
32	8	RD	SB main power binding post to 105 A breaker on engine
33	12	RD-WT	CB33 to master switch (bottom right term) to master switch (bottom left term)
33	12	RD-WT	CB33 to SB3, SB3 to rear 19-cond. And front 19-cond to VB rear 30 A breaker and VB front 30 A breaker
33	12	RD	30 A breaker to binding post of front VB and rear VB
33	16	RD	All red wires from din connectors of air valves 1 thru 10 (front hopper) and 11 thru 20 (rear hopper) to binding posts in each valve box
33	16	RD	VB1 to air solenoid valve #1
33	16	RD	VB2 to air solenoid valve #2
33	16	RD	VB3 to air solenoid valve #3
33	16	RD	VB4 to air solenoid valve #4
33	16	RD	VB5 to air solenoid valve #5
33	16	RD	VB6 to air solenoid valve #6
33	16	RD	VB7 to air solenoid valve #7
33	16	RD	VB8 to air solenoid valve #8
33	16	RD	VB9 to air solenoid valve #9
33	16	RD	VB10 to air solenoid valve #10
33	16	RD	VB11 to air solenoid valve #11
33	16	RD	VB12 to air solenoid valve #12
33	16	RD	VB13 to air solenoid valve #13
33	16	RD	VB14 to air solenoid valve #14
33	16	RD	VB15 to air solenoid valve #15
33	16	RD	VB16 to air solenoid valve #16
33	16	RD	VB17 to air solenoid valve #17
33	16	RD	VB18 to air solenoid valve #18
33	16	RD	VB19 to air solenoid valve #19
33	16	RD	VB20 to air solenoid valve #20
34	16	BU	CB34 from buzzer and air pressure light
34	16	BU	CB34 to air pressure sending unit on throttle valve
35	16	WT	CB35 to amplifier port #5 (valve -) to top right-hand term forward/reverse switch
35	10	WT-BK-RD	Top right-hand term to bottom center terminal of forward/reverse switch
36	16	WT-BK-GN	CB36 to right-hand belt switch (bottom term)

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
36	16	WT-BK-GN	CB36 to SB20 (19-cond.)
36	14	WT	SB20 to right-hand (2-cond.) hopper diaphragm switch
37	16	RD	CB37 to buzzer diode
38	16	WT-BK-YL	CB38 to left-hand belt switch (bottom term)
38	16	WT-BK-YL	CB38 to SB17 (19-cond.)
38	16	BN	SB17 to left-hand (2-cond.) hopper diaphragm switch
39 – 40			CB39 – CB40 (for CB radio option)
41	16	BK	(CB) ground to CRC (computer)
42	SHLD		(CB) ground to CRC (computer)
44	16	GN	(CB) forward and reverse switch from diodes to (CB) relay (term #7)
45	12	RD	(CB) breaker (left term) to beacon switch (middle left term) to beacon switch (middle right term)
46	10	RD	(CB) breaker (right term) to ignition switch (+12V term)
47	12	RD	(CB) breaker (left term) to voltmeter (+ term)
47	16	RD	(CB) voltmeter (+ term) to oil pressure gauge (+ term) to fuel gauge (+ term) to tachometer (+ term) to water temperature gauge (+ term) to hydraulic oil temp gauge (+ term)
48	16	BK	(CB) ground to relay (term #2) to all lights & gauges & potentiometer
49	16	RD	(CB) low-lock switch (middle term) to beacon switch (middle right term) to left belt switch (top term) to hitch switch (middle term) to right belt switch (top term) to hopper shift (middle term) both, front, & rear switches
50	16	RD	(CB) horn switch (left term) to left term 15 Amp circuit breaker to warning gauge light terminals (+ side)
51	16	BU	(CB) light switch (middle left term) to all gauge lights
52	8	RD	JB17 to breaker (battery term)
52	12	RD	Out breaker (aux. Term) to relays #1 & #2 (#30 term) out
52	16	BU	Relay #1 (#87 term) to JB27
52	16	BU	JB27 to fan #1
52	16	BU	Relay #2 (#87 term) to JB28
52	16	BU	JB28 to fan #2
53	16	RD	JB18 to JB30 (acc to relay to sensor)
53	16	RD	JB30 to relay #1 jump to relay #2 (#86 term)
53	16	OR	Out relay #2 (#85 term) jump to relay #1 (#85 term) to JB26
53	16	OR	JB26 to temperature switch on hydraulic return manifold
54	16	YL	Turn signal switch to JB22
54	16	YL	JB22 to flasher
54	16	RD	Out flasher to JB29
54	16	RD	JB29 to breaker (aux. Term)
55	16	BK	Turn signal switch to JB23 (ground)

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
55	16	BK	JB23 to stop light switch
55	16	RD	Light switch to JB18
56			SLAVE
57 – 59			JB24-JB25 (SPARE)
60	16	BK	BB1 from ground
60	16	WT	BB1 to female trailer light socket (ground)
61	16	YL	BB5 to female trailer light socket (optional)
62	16	GN	BB7 to female trailer light socket (optional)
63	16	BN	BB9 to female trailer light socket (optional)
64	16	BU	Turn signal switch to BB2
64	16	YL	BB2 to left front turn signal
65	16	GN	Turn signal switch to BB3
65	16	GN	BB3 to right front turn signal
66	16	YL	Turn signal switch to BB4
66	Diode		BB4 to BB5
66	16	GN	BB5 to left rear turn signal
67	16	BN	Turn signal switch to BB6
67	Diode		BB6 to BB7
67	16	GN	BB7 to right rear turn signal
68	12	RD	Ground screw in VB to ground screw in SB (rear 19-cond.)
68	16	BK	Ground screw in VB to rear cam switch (center term)
68	16	BK	Cam switch (center term) to gate switch (center term)
68	16	BK	Jumper wires from center term of all gate switches (rear VB)
69	12	RD	Ground screw in VB to ground screw in SB (front 19-cond.)
69	16	BK	Ground screw in VB to front cam switch (center term)
69	16	BK	Cam switch (center term) to gate switch (center term)
69	16	BK	Jumper wires from center term of all gate switches (front VB)
70 – 76			SPARE
77	16	BN	Right-hand VB10 from computer slave SL-20
77	16	BK	Right-hand VB10 to air solenoid valve #20
77	16	BK	Right-hand VB10 to switch #20 (bottom term)
78	16	BN	Right-hand VB9 from computer slave SL-19
78	16	BK	Right-hand VB9 to air solenoid valve #19
78	16	BN	Right-hand VB9 to switch #19 (bottom term)
79	16	BU	Right-hand VB8 from computer slave SL-18
79	16	BK	Right-hand VB8 to air solenoid valve #18
79	16	BU	Right-hand VB8 to switch #18 (bottom term)

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
80	16	GN	Right-hand VB7 from computer slave SL-17
80	16	BK	Right-hand VB7 to air solenoid valve #17
80	16	GN	Right-hand VB7 to switch #17 (bottom term)
81	16	PU	Right-hand VB6 from computer slave SL-16
81	16	BK	Right-hand VB6 to air solenoid valve #16
81	16	PU	Right-hand VB6 to switch #16 (bottom term)
82	16	SL	Right-hand VB5 from computer slave SL-15
82	16	BK	Right-hand VB5 to air solenoid valve #15
82	16	SL	Right-hand VB5 to switch #15 (bottom term)
83	16	YL	Right-hand VB4 from computer slave SL-14
83	16	BK	Right-hand VB4 to air solenoid valve #14
83	16	YL	Right-hand VB4 to switch #14 (bottom term)
84	16	WT-BK	Right-hand VB3 from computer slave SL-13
84	16	BK	Right-hand VB3 to air solenoid valve #13
84	16	WT-BK	Right-hand VB3 to switch #13 (bottom term)
85	16	WT-BN	Right-hand VB2 from computer slave SL-12
85	16	BK	Right-hand VB2 to air solenoid valve #12
85	16	WT-BN	Right-hand VB2 to switch #12 (bottom term)
86	16	WT-BK-GN	Right-hand VB1 from computer slave SL-11
86	16	BK	Right-hand VB1 to air solenoid valve #11
86	16	WT-BK-GN	Right-hand VB1 to switch #11 (bottom term)
87	16	WT-BK-GN	Left-hand VB1 from computer slave SL-10
87	16	BK	Left-hand VB1 to air solenoid valve #10
87	16	WT-BK-GN	Left-hand VB1 to switch #10 (bottom term)
88	16	WT-BN	Left-hand VB2 from computer slave SL-9
88	16	BK	Left-hand VB2 to air solenoid valve #9
88	16	WT-BN	Left-hand VB2 to switch #9 (bottom term)
89	16	WT-BK	Left-hand VB3 from computer slave SL-8
89	16	BK	Left-hand VB3 to air solenoid valve #8
89	16	WT-BK	Left-hand VB3 to switch #8 (bottom term)
90	16	YL	Left-hand VB4 from computer slave SL-7
90	16	BK	Left-hand VB4 to air solenoid valve #7
90	16	OR	Left-hand VB4 to switch #7 (bottom term)
91	16	SL	Left-hand VB5 from computer slave SL-6
91	16	BK	Left-hand VB5 to air solenoid valve #6
91	16	SL	Left-hand VB5 to switch #6 (bottom term)
92	16	PU	Left-hand VB6 from computer slave SL-5

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
92	16	BK	Left-hand VB6 to air solenoid valve #5
92	16	PU	Left-hand VB6 to switch #5 (bottom term)
93	16	GN	Left-hand VB7 from computer slave SL-4
93	16	BK	Left-hand VB7 to air solenoid valve #4
93	16	GN	Left-hand VB7 to switch #4 (bottom term)
94	16	BU	Left-hand VB8 from computer slave SL-3
94	16	BK	Left-hand VB8 to air solenoid valve #3
94	16	BU	Left-hand VB8 to switch #3 (bottom term)
95	16	BN	Left-hand VB9 from computer slave SL-2
95	16	BK	Left-hand VB9 to air solenoid valve #2
95	16	BN	Left-hand VB9 to switch #2 (bottom term)
96	16	BK	Left-hand VB10 from computer slave SL-1
96	16	BK	Left-hand VB10 to air solenoid valve #1
96	16	BK	Left-hand VB10 to switch #1 (bottom term)
97	16	WT-BK-BU	VB16 from computer slave pin #26 (right-hand 19-cond.)
97	16	WT-BK-BU	VB16 to rear cam switch (bottom Term) (right-hand 19-cond.)
97	16	BK	VB16 to hydraulic cam valve right-hand coil (right-hand VB)
98	16	WT-BK-OR	VB15 from computer slave pin #25 (right-hand 19-cond.)
98	16	WT-BK-OR	VB15 to right-hand cam switch (top term) (right-hand 19-cond.)
98	16	BK	VB15 to hydraulic cam valve left-hand coil (right-hand VB)
99	16	WT-BK-BU	VB16 from computer slave pin #24 (left-hand 19-cond.)
99	16	WT-BK-BU	VB16 to left-hand cam switch (top term) (left-hand 19-cond.)
99	16	BK	VB16 to hydraulic cam valve right-hand coil (left-hand VB)
100	16	WT-BK-OR	VB15 from computer slave pin #23
100	16	WT-BK-OR	VB15 to left-hand cam switch (bottom term)
100	16	BK	VB15 to hydraulic cam valve left-hand coil (front VB)
101	16	WT-RD	SB3 (left-hand 19-cond.) to front VB18 to right-hand hydraulic coil
101	16	WT-RD	To jumper to VB13 to left-hand hydraulic coil
102	16	WT-RD	SB3 (right-hand 19-cond.) to rear VB18 to right-hand hydraulic coil
102	16	WT-RD	To jumper to VB13 to left-hand hydraulic coil
103	14	BK	SB power 70 A relay ¼" connector to L port slave
104	16	UNSHD & BK	SB from computer slave (off gray 3-wire) (J port)
104	16	UNSHD & BK	To FPM sensor
105	16	WT	SB from computer slave (off gray 3-wire) (G port)
105	16	WT	To FPM sensor
106	16	RD	SB from computer slave (off gray 3-wire) (A port)
106	16	RD	To 5 A fuse to FPM sensor

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
107	16	UNSHD & BK	SB from computer slave (off gray 3-wire) (E port)
107	16	UNSHD & BK	To rear barrier strip on hopper to potentiometer right term
108	16	RD	SB from computer slave (off gray 3-wire) (F port)
108	16	RD	To rear barrier strip on hopper to potentiometer left term
109	16	WT	SB from computer slave (off gray 3-wire) (C port)
109	16	WT	To rear barrier strip on hopper to potentiometer middle term
110	16	UNSHD & BK	SB from computer slave (off gray 3-wire) (E port)
110	16	UNSHD & BK	To front barrier strip on hopper to potentiometer right term
111	16	WT	SB from computer slave (off gray 3-wire) (D port)
111	16	WT	To front barrier strip on hopper to potentiometer left term
112	16	RD	SB from computer slave (off gray 3-wire) (F port)
112	16	RD	To front barrier strip on hopper to potentiometer middle term
113 – 120			SPARE
121	Diode		From left-hand term on both hopper switches to right-hand term on front hopper switch and left-hand term on rear hopper switch
121	Diode		From right-hand term on both hopper switches to right-hand term on front hopper switch and left-hand term on rear hopper switch
122	16	WT-BK	From left-hand term of front hopper switch to CB122
122	16	WT-BK	CB122 (cab 19-cond.) to SB8 to front control box
122	16	RD	Front hopper switch in control box (4-cond.)
122	16	BK	From left-hand term of front hopper switch to top left-hand term hydraulic valve coil
123	16	WT-OR	From left-hand of front hopper switch to CB123
123	16	WT-OR	CB123 (cab 19-cond.) to SB9 to front control box
123	16	WT	Front hopper switch in control box (4-cond.)
123	16	WT	From right-hand term of front hopper switch to top right-hand term hydraulic valve coil
124	16	WT-SL	From right-hand term of rear hopper switch to CB124
124	16	WT-SL	CB124 (cab 19-cond.) to SB10 to front control box
124	16	BK	Rear hopper switch in control box (4-cond.)
124	16	RD	From right-hand term of rear hopper switch to bottom left-hand term hydraulic valve coil
125	16	WT-RD	From right-hand term of rear hopper switch to CB125
125	16	WT-RD	CB125 (19-cond.) to SB1 to front control box
125	16	GN	Rear hopper switch in control box (4-cond.)
125	16	BN	From left-hand term of rear hopper switch to bottom right-hand term hydraulic valve coil
126	16	YL	From bottom term hitch raise switch to CB126
126	16	YL	CB126 to JB126 aux. Barrier strip to top hitch hydraulic valve coil
127	16	GN	From top term hitch raise switch to CB127

Table 8-1. BC SuperChipper Tandem Series Electrical Circuit

Wire No.	Wire Size	Wire Color	Description
127	16	GN	CB126 to JB126 aux. Barrier strip to bottom hitch hydraulic valve coil
128	16	RD	From bottom term low-lock switch to CB128 aux. Barrier strip
128	16	RD	CB128 aux. Barrier strip to (2-cond.) low-lock valve on trans
129	16	RD	Neutral light to CB129 aux. Barrier strip to low-lock switch
129	16	BK	From low-lock valve to ground on CB aux. Barrier strip
129	16	BK	From low-lock switch to ground on CB aux. Barrier strip

Table 8-2. Air System Hose and Fittings, 2-Wheel Drive

Hose No.	Hose Type	Length	Fitting	Hose Description
1	H10408	124"	8U-8FJX, 2 Ea.	From Regulator on Top Port of Air Tank (on Frame) to Chip Box Air Tank.
2	100R5.188	118"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on End of Air Tank (on Frame) to Front Top 90D4MJ-2MPL on D-2 Governor.
3	H10408	55"	8U-8FJX 45D8U-8FJX	From 90D8MJ-8MP on Rear of Air Tank (on Frame) to Check Valve (comes with Air Dryer) on Wet Tank Right-Hand side.
4	100R5.188	34"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on top of Compressor (on Cummins Engine) to Tee on Front of D-2 Governor.
5	S-10TW	68"	8E4-8FJX, 2 Ea.	From Compressor (Supply S/S Hose) to Top Port of E-Con Valve (comes with Air Dryer).
6	H10408	115"	8U-8FJX, 2 Ea.	From Air Tank (on Frame) to Right-Hand Front 8MJ-8MP on Treadle Valve.
7	1/8" SYNFLEX	24"	NONE	From 90D 10-32 Push-Lock to bottom on Air to Gauge in Console.
8	SPARE			
9	100R5.188	50"	4U-4FJX, 2 Ea.	From Tee on Left-Hand Front Port of Shuttle Valve (with Low Pressure Switch) to IN Port of 3-Way Mack Valve.
10	100R5.188	97"	4U-4FJX, 2 Ea.	From 3-Way Mack Valve OUT Port to Air Horn.
11	H10408	56"	8U-8FJX, 2 Ea.	From 90D8MJ-8MP Top Right-Hand Port of Treadle Valve to Right-Hand Port of Stop Light Switch.
12	SPARE			
13	100R5.188	36"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on Right-Hand Lower Port of Treadle Valve to 90D4MJ-2MP on Front Center Port of Emergency Brake Control.
14	SPARE			
15	H10408	56"	8U-8FJX, 2 Ea.	From 90D8MJ-4MP Top Port of 45# Fixed Regulator to Tee on Bottom Port of Double Check Valve Brake Switch.
16	H10408	40"	8U-8FJX, 2 Ea.	From Left-Hand Port of Double Check Valve Brake Switch to 8MJ-4MP Forward Glad Hand.
17	100R5.188	90"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on Right-Hand Rear Port of Tee on Quick Release Valve.
18	100R5.188	11 1/2"	4U-4FJX, 2 Ea.	From Lower Port of 3-Way Ball Valve to 4MJ-4MP of Glad Hand.
19	H10408	52"	8U-8FJX, 2 Ea.	From Tee on Bottom Port of Double Check Valve Brake Switch to Middle Port of Left-Hand Quick Release Valve.
20	100R5.188	116"	4U-4FJX, 2 Ea.	From Center Port of 3-Way Ball Valve to Center Port of Right-Hand Quick Release Valve.
21	H10408	26"	8U-8FJX, 2 Ea.	From Front Port of Quick Release Valve to Forward Port of Right-Hand Air Brake Chamber.
22	H10408	34"	8U-8FJX, 2 Ea.	From Rear Port of Right-Hand Quick Release Valve to Forward Port of Left-Hand Air Brake Chamber.
23	H10408	34"	8U-8FJX, 2 Ea.	From Right-Hand Rear Port on Right-Hand Air Brake Chamber to Rear Port of Left-Hand Quick Release Valve.
24	H10408	26"	8U-8FJX, 2 Ea.	From Front Port of Left-Hand Quick Release Valve to Rear Port of Left-Hand Air Brake Chamber.

Table 8-2. Air System Hose and Fittings, 2-Wheel Drive

Hose No.	Hose Type	Length	Fitting	Hose Description
25	H10408	15"	8U-8FJX, 2 Ea.	From Front Port of Quick Release Valve (with 45# Regulator) to Front Port of Air Can on Master Cylinder.
26	SPARE			
27	H10408	75"	8U-8FJX, 2 Ea.	From Quick Release Valve to Top Port of Air Can on Parking Disc Brake.
28	SPARE			
29	100R5.188	10 ½"	4U-4FJX, 2 Ea.	From Tee on Bottom of D-2 Governor to Air Dryer Left-Hand Port.
30	H10408	30"	8U-8FJX, 2 Ea.	From 90D8MJ-8MP on Right-Hand Front of Air Dryer to 90D8MJ-8MP on Top Left-Hand Port of Wet Tank.
31	100R5.188	17"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP (Fitting Comes with E-Con Valve, has Built-In Check Valve) on Bottom Port of E-Con Valve to Top Outside 4MJ-2MP Port of D-2 Governor.
32	100R5.188	19"	4U-4FJX & 90D4E-4FJX	From 90D4MJ-4MP Front Center Port of E-Con Valve to Lower Outside Port 4MJ-2MP on D-2 Governor.
33	100R5.188	24"	4U-4FJX, 2 Ea.	From Front Port of Tee on Quick Release Valve to Upper Port of 3-Way Ball Valve.

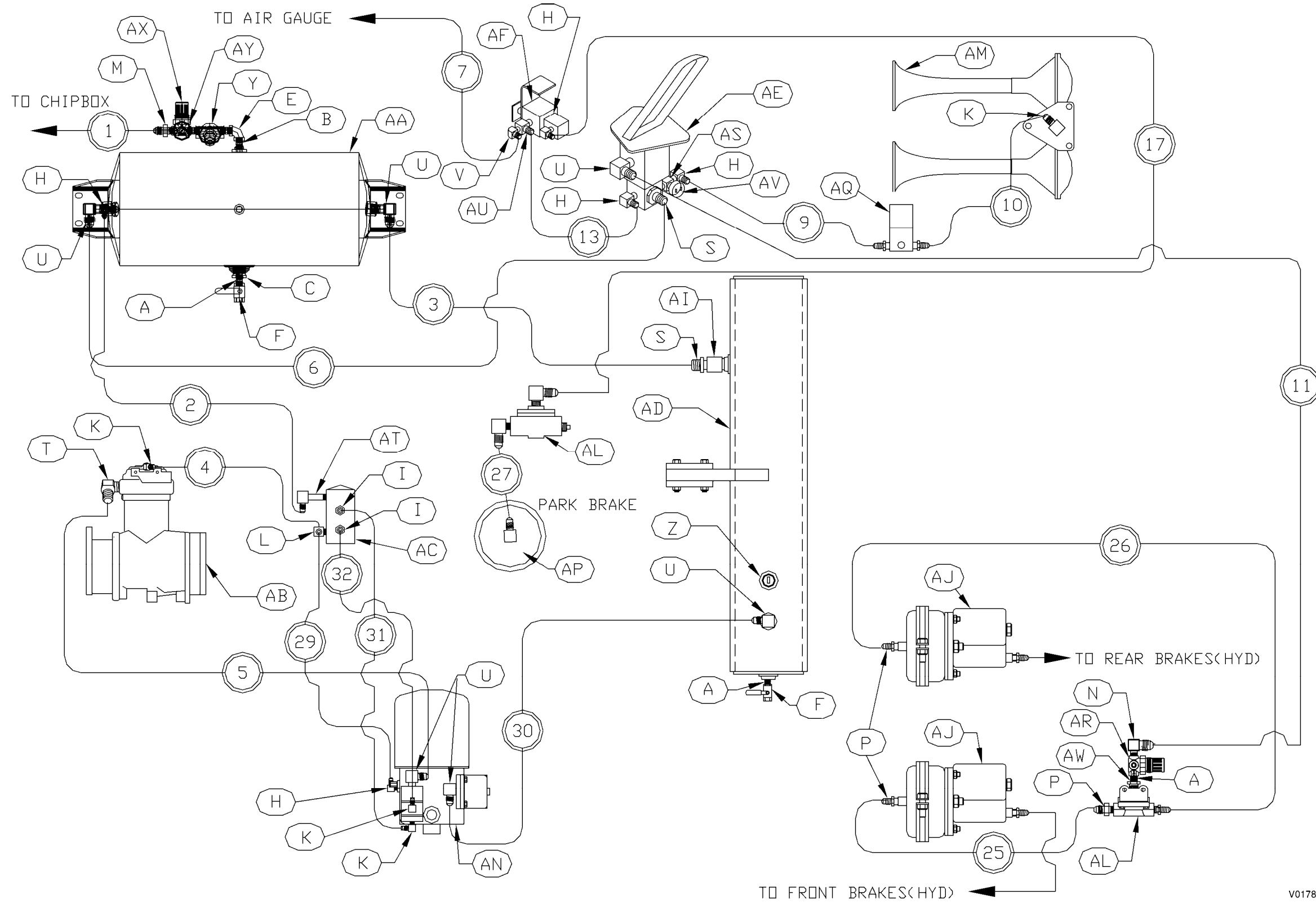


Figure 8-16. Air System Hose and Fitting Diagram, 4-Wheel Drive (up to 2007)

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Table 8-3. Air System Hose and Fittings, 4-Wheel Drive

Hose No.	Hose Type	Length	Fitting	Hose Description
1	H10408	124"	8U-8FJX, 2 Ea.	From Regulator on Top Port of Air Tank (on Frame) to Chip Box Air Tank.
2	100R5.188	118"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on End of Air Tank (on Frame) to Front Top 90D4MJ-2MPL on D-2 Governor.
3	H10408	55"	8U-8FJX & 45D8U-8FJX	From 90D8MJ-8MP on Rear of Air Tank (on Frame) to Check Valve (comes with Air Dryer) on Wet Tank Right-Hand Side.
4	100R5.188	34"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on Top of Compressor (on Cummins Engine) to Tee on Front of D-2 Governor.
5	S-10TW	68"	8E4-8FJX, 2 Ea.	From Compressor (Supply S/S Hose) to Top Port of E-Con Valve (comes with Air Dryer).
6	H10408	115"	8U-8FJX, 2 Ea.	From Air Tank (on Frame) to Right-Hand Front 8MJ-8MP on Treadle Valve.
7	1/8" SYNDFLEX	24"	NONE	From 90D 10-32 Push Lock Fitting to Bottom on Air Gauge in Console.
8	SPARE			
9	100R5.188	50"	4U-4FJX, 2 Ea.	From Tee on Left-Hand Front Port of Shuttle Valve (with Low Pressure Switch) to IN Port of 3-Way Mack Valve.
10	100R5.188	97"	4U-4FJX, 2 Ea.	From 3-Way Mack Valve OUT Port to Air Horn.
11	H10408	56"	8U-8FJX, 2 Ea.	From 90D8MJ-8MP Top Right-Hand Port of Treadle Valve to Top Port 45# Regulator.
12	SPARE			
13	100R5.188	36"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on Right-Hand Lower Port of Treadle Valve to 90D4MJ-2MP on Front Center Port of Emergency Brake Control.
14	SPARE			
15	SPARE			
16	SPARE			
17	100R5.188	90"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP on Right-Hand Rear Port of Emergency Brake Control Valve to Upper Port of Quick Release Valve Front Parking Disc Brake.
18	SPARE			
19	SPARE			
20	SPARE			
21	SPARE			
24	SPARE			
25	H10408	15"	8U-8FJX, 2 Ea.	From Front Port of Quick Release Valve (with 45# Regulator) to Front Port of Air Can Master Cylinder.
26	H10408	40"	8U-8FJX, 2 Ea.	From Right-Hand Port of Quick Release Port to Front Port of Air Can on Master Cylinder.
27	H10408	75"	8U-8FJX, 2 Ea.	From Quick Release Valve to Top Port of Air Can on Parking Disc Brake.
28	SPARE			
29	100R5.188	10 1/2"	4U-4FJX, 2 Ea.	From Tee on Bottom of D-2 Governor to Air Dryer Left-Hand Port.

Table 8-3. Air System Hose and Fittings, 4-Wheel Drive

Hose No.	Hose Type	Length	Fitting	Hose Description
30	H10408	30"	8U-8FJX, 2 Ea.	From 90D8MJ-8MP on Right-Hand Front of Air Dryer to 90D8MJ-8MP on Top Left-Hand Port of Wet Tank.
31	100R.188	17"	4U-4FJX, 2 Ea.	From 90D4MJ-4MP (Fitting Comes with E-Con Valve, has Built in Check Valve) on Bottom Port of E-Con Valve to Top Outside 4MJ-2MP Port of D-2 Governor.
32	100R5.188	19"	4U-4FJX & 90D4E-4FJX	From 90D4MJ-4MP Front Center Port of E-Con Valve of Lower Outside Port 4MJ-2MP on D-2 Governor.

Table 8-4. Air System Parts and Fittings Chart

Item No.	Description	Part Number	Qty
A	Nipple ¼" X Close	FIT-28001	3
B	Nipple ¼" X 1 ½"	FIT-28012	1
C	Bushing Hex ¾" X ¼"	FIT-28346	1
D	Bushing Hex ½" X ¼"	FIT-28344	3
E	90° Pipe Straight Elbow ¼"	FIT-28236	1
F	Valve Ball ¼"	VLV-29195	2
G	¼" Male Jic X ¼" Male Pipe	4MJ-4MP	1
H	90° ¼" Male Jic X ¼" Male Pipe	90D4MJ-4MP	7
I	¼" Male Jic X 1/8" Male Pipe	4MJ-2MP	2
J	90° ¼" Male Jic X 3/8" Male Pipe	90D4MJ-6MP	1
K	90° ¼" Male Jic X 1/8" Male Pipe	90D4MJ-2MP	4
L	Tee ¼" Male Jic X ¼" Male Pipe X ¼" Male Jic	T4MJ-2MP-4MJ	1
M	½" Male Jic X ¼" Male Pipe	8MJ-4MP	2
N	90° ½" Male Jic X ¼" Male Pipe	90D8MJ-4MP	5
O	3/8" Female Pipe X ½" Male Jic	6FP-8MP	1
P	½" Male Jic X 3/8" Male Pipe	8MJ-6MP	6
Q	90° ½" Male Jic X 3/8" Male Pipe	90D8MJ-6MP	2
R	Tee ½" Male Jic 3/8" Male Pipe X ½" Male Jic	T8MJ-6MP-8MJ	1
S	½" Male Jic ½" Male Pipe	8MJ-8MP	2
T	½" Male Jic X ¾" Male Pipe	8MJ-12MP	1
U	90° ½" Male Jic X ½" Male Pipe	90D8MJ-8MP	6
V	90° ½" Push Lock X 10-32 Thread	90D2PL-10-32M	1
W	½" MP X ¾" Bulk Head X ½" Male Pipe	8MP-12BH-8MP	2
X	Glad Hand	ELC-22370	2
Y	60 PSI Governor	MTR-25255	1
Z	Safety Relief Valve (150 PSI)	VLV-51638	1
AA	Air Tank Assembly Chassis	TNK-51993	1
AB	Cummins Engine Part	Compressor	1
AC	D-2 Governor	VLV-51637	1
AD	Wet Air Tank	HSG-51437	1
AE	E3 Brake Valve	VLV-51639	1
AF	Valve PP3 Brake Control	VLV-51640	1
AG	Valve S/S 3-Way Ball Valve	VLV-29216	1
AH	DS2 DB1 Check & Stop Light Switch	VLV-51641	1
AI	Comes With Air Dryer	Pressure Controlled CK Valve	1
AJ	Master/Cylinder Air/Hydraulic JD&SP/Dana (2-Ea if 4-Wheel Drive).	PTM-51644	1

Table 8-4. Air System Parts and Fittings Chart

Item No.	Description	Part Number	Qty
AK	Comes on Rear Axle	Air Chamber Rear Brakes	2
AL	QR-1 Quick Release Valve	VLV-51642	3
AM	Horn	MSC-51645	1
AN	Comes With Air Dryer	E-Con Valve	1
AO	Air Dryer Rockwell Wabco	FTR-60949	1
AP	Brake Parking Assembly	PTM-53235	1
AQ	SPARE		
AR	Regulator Air 45# Fixed ¼" NPT	VLV-26201	1
AS	Tee ¼" Female Pipe X ¼" Female Pipe X ¼" Male Pipe	T4FP-4FP-4MP	1
AT	90° ¼" Male Jic X ¼" Male Pipe Long	90D4MJ-2MP-L	1
AU	Modified (90D4MJ-2MP) Air Supply	FIT-51998	1
AV	Switch Low Air 65 PSI Control Grnd	ELC-60309	1
AW	Bushing Hex 3/8" X ¼"	FIT-28342	1
AX	Regulator Air 80# Fixed ¼" NPT	VLV-26199	1
AY	Gauge 1 ½" Dia (O-160) 1/8" NPT Control Port	MTR-50665	1

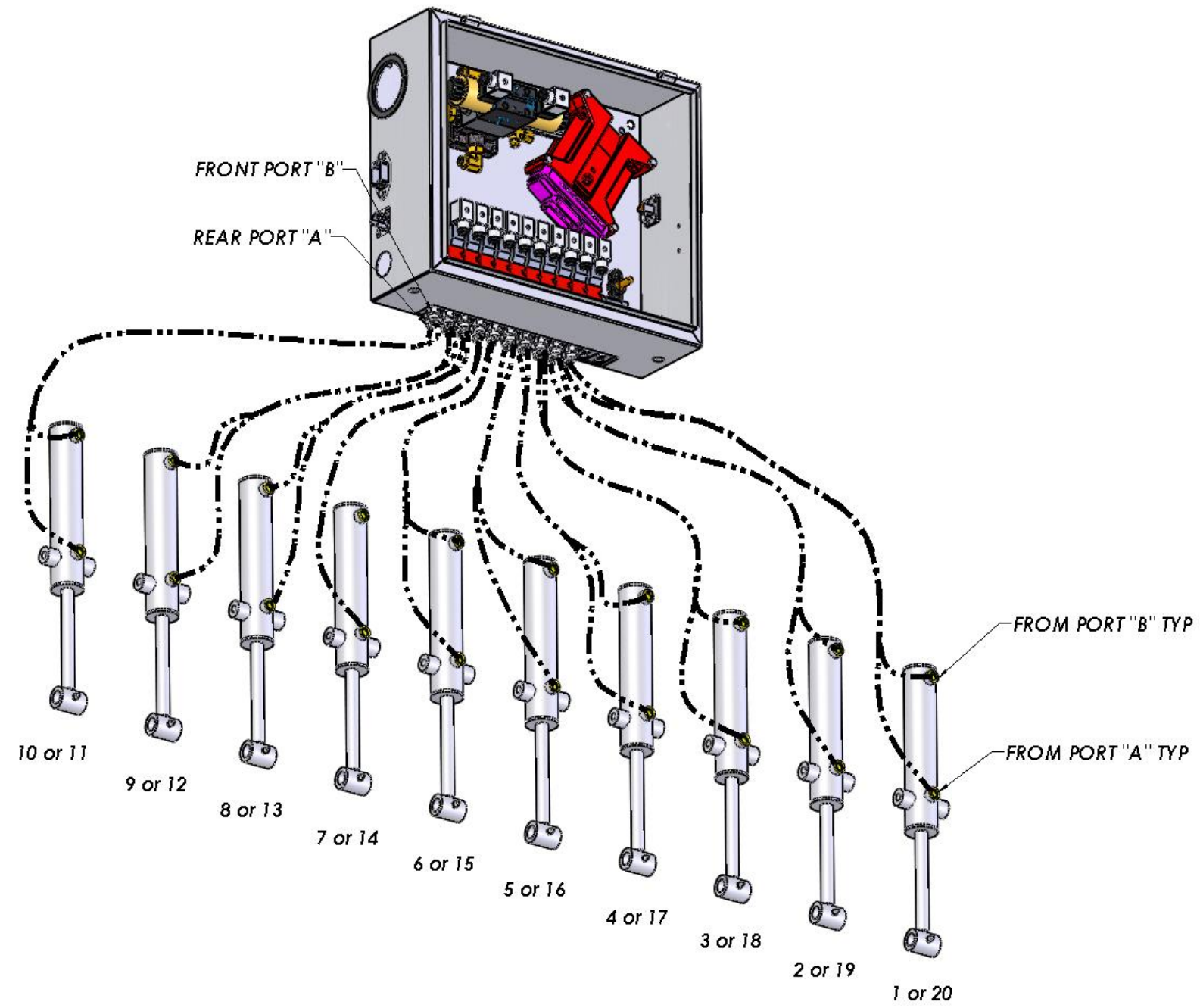


Figure 8-17. Spread Hopper Gate Air System

Table 8-5. Air System Hose and Fittings, Spread Hopper Gates, Front and Rear

Hose No. (A & B)	Hose Type	Length	Fitting	Hose Description
1A or 20A	100R5.188	20"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 1 and No. 20 Gate Cylinder to "A" Port Air Valve.
1B or 20B	100R5.188	18"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 1 and No. 20 Gate Cylinder to "B" Port Air Valve.
2A or 19A	100R5.188	20"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 2 and No. 19 Gate Cylinder to "A" Port Air Valve.
2B or 19B	100R5.188	18"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 2 and No. 19 Gate Cylinder to "B" Port Air Valve.
3A or 18A	100R5.188	30 ½"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 3 and No. 18 Gate Cylinder to "A" Port Air Valve.
3B or 18B	100R5.188	23 ½"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 3 and No. 18 Gate Cylinder to "B" Port Air Valve.
4A or 17A	100R5.188	43"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 4 and No. 17 Gate Cylinder to "A" Port Air Valve.
4B or 17B	100R5.188	34 ½"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 4 and No. 17 Gate Cylinder to "B" Port Air Valve.
5A or 16A	100R5.188	53 ½"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 5 and No. 16 Gate Cylinder to "A" Port Air Valve.
5B or 16B	100R5.188	45"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 5 and No. 16 Gate Cylinder to "B" Port Air Valve.
6A or 15A	100R5.188	71 ½"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 6 and No. 15 Gate Cylinder to "A" Port Air Valve.
6B or 15B	100R5.188	58"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 6 and No. 15 Gate Cylinder to "B" Port Air Valve.
7A or 14A	100R5.188	74"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 7 and No. 14 Gate Cylinder to "A" Port Air Valve.
7B or 14B	100R5.188	68"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 7 and No. 14 Gate Cylinder to "B" Port Air Valve.
8A or 13A	100R5.188	86"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 8 and No. 13 Gate Cylinder to "A" Port Air Valve.
8B or 13B	100R5.188	77"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 8 and No. 13 Gate Cylinder to "B" Port Air Valve.
9A or 12A	100R5.188	93"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 9 and No. 12 Gate Cylinder to "A" Port Air Valve.
9B or 12B	100R5.188	88"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 9 and No. 12 Gate Cylinder to "B" Port Air Valve.
10A or 11A	100R5.188	105 ½"	RS4, R4FJ, RN4FJX	From Bottom Port "A" on No. 10 and No. 11 Gate Cylinder to "A" Port Air Valve.
10B or 11B	100R5.188	99"	RS4, R4FJ, RN4FJX	From Top Port "B" on No. 10 and No. 11 Gate Cylinder to "B" Port Air Valve.
Air Supply	H10408	104"	8U-8FJX, 90D8U-8FJX-L	From Air Tank on Hopper to Air Valve Assembly in Valve Box.

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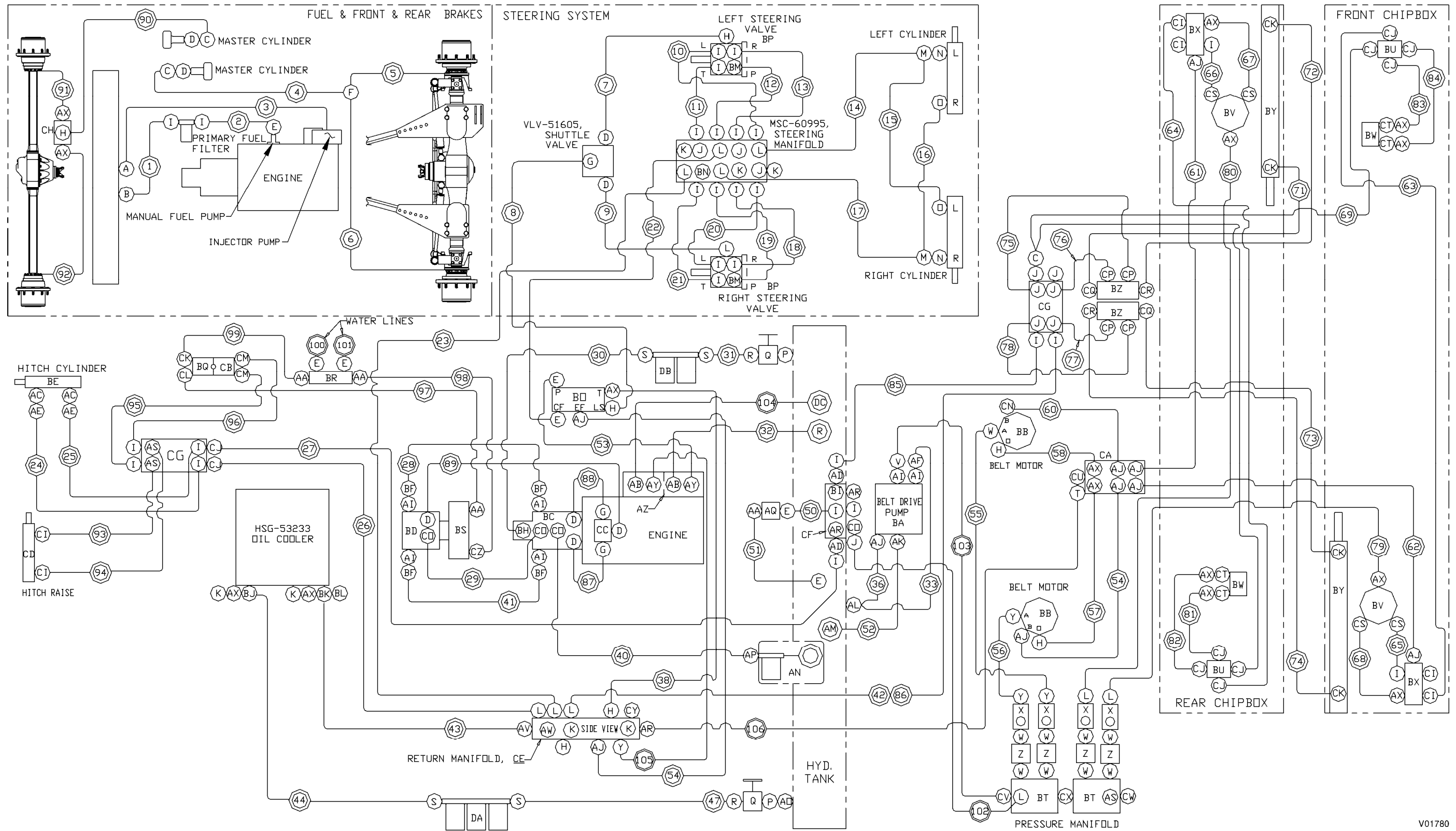


Figure 8-18. Hydraulic/Misc. Hose and Fittings

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Table 8-6. Hydraulic/Misc. Hose and Fittings

Item No.	Hose Type	Length	Fitting	Hose Description
1	H10408	118"	8U-8FJX, 2 Ea.	From Diesel Tank Supply to IN Port Primary Fuel Filter on Frame.
2	H10408	50"	8U-8FJX, 2 Ea.	From OUT Port of Primary Fuel Filter on Frame to Cummins Primary Fuel Filter.
3	5/16" Fuel Hose	160"	5PL-4MP & 90D5PL-4MP	Return Off Injector Pump to Fuel Tank.
4	H24504	98"	4U2-4FJX, 2 Ea.	From Brake Master Cylinder to T4MJ-4MJ-MJ Tee on Left-Hand Brake on Drive Axle.
5	H24504	19 ½"	4U2-4FJX & 90D4U2-4FJX	From T4MJ-4MJ-4MJ Tee to Left-Hand Brake.
6	H24504	70"	4U2-4FJX & 90D4U2-4FJX	From T4MJ-4MJ-4MJ Tee to Right-Hand Brake.
7	H24504	39 ¼"	4U2-4FJX, 2 Ea.	From 90D4MB-4MJ on Left Steering Valve (LS Port) to 6MB-4MJ on Shuttle Valve Port on Left Side.
8	H24504	26"	4U2-4FJX & 90D4U2-4FJX	From 90D4MB-4MJ (LS Port) of Priority Valve to Center Port of Shuttle Valve.
9	H24504	39 ¼"	4U2-4FJX, 2 Ea.	From 90D4MB-4MJ Hand Steering Valve (LS Port) to 6MB-4MJ on Right-Hand Side of Shuttle Valve.
10	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ Bottom Port on Steering Manifold Left-Hand Side to 8MB-8MJ (L Port) at Left-Hand Steering Valve.
11	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ Top Part on Steering Manifold Left-Hand Side to 8MB-8MJ (T Port) of Left-Hand Steering Valve.
12	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ 2 nd Port From Top on Steering Manifold Left-Hand Side to (P Port) of Left-Hand Steering Valve.
13	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ 3 rd Port From Top on Steering Manifold Left-Hand Side to (R Port) of Left-Hand Steering Valve.
14	H10408	115"	8U-8FJX & 45D8U-8FJX	From 90D8MB-8MJ Front Bottom Left to T8MB-8MJ-8MJ Tee on Port of Rod End of Left-Hand Steering Cylinder.
15	H10408	31 ½"	8U-8FJX & 45D8U-8FJX	From T8MB-8MJ Tee on Left-Hand Steering Cylinder to 90D6MB-8MJ on Rear Port of Right-Hand Steering Cylinder.
16	H10408	31 ½"	8U-8FJX & 45D8U-8FJX	From T8MB-8MJ-8MJ Tee on Right-Hand Steering Cylinder to 90D6MB-8MJ on Rear Port of Left-Hand Steering Cylinder.
17	H10408	110"	8U-8FJX & 45D8U-8FJX	From 90D8MB-8MJ Front Bottom Right to T8MB-8MJ-8MJ Tee on Port of Rod End of Right-Hand Steering Cylinder.
18	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ 3 rd Port from Top on Steering Manifold Right-Hand Side to (R Port) of Steering Valve.
19	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ 2 nd Port from Top on Steering Manifold Right-Hand Side to (P Port) of Right-Hand Steering Valve.
20	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ Bottom Port on Steering Manifold Right-Hand Side to 8MB-8MJ (L Port) of Right-Hand Steering Valve.
21	H10408	35 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ Top Port on Steering Manifold Right-Hand Side to 8MB-8MJ (T Port) of Right-Hand Steering Valve.
22	H10408	12"	8U-8FJX, & 90D8U-8FJX	From 90D8MB-8MJ Center Left-Hand Port of Steering Manifold to 90D8MB-8MJ of "CF" Port of Priority Valve.
23	H10408	77"	8U-8FJX, 2 Ea.	From 90D8MB-8MJ Top Right-Hand Port of Steering Manifold to 90D8MB-8MJ 2 nd Port on Top of Return Manifold.



Table 8-6. Hydraulic/Misc. Hose and Fittings

Item No.	Hose Type	Length	Fitting	Hose Description
24	H10408	96"	8U-8FJX, 2 Ea.	From 90D8MB-8MJ (B Port) of Hitch Manifold to T8MB-8MJ-8MJ Tee Rod End of Hitch Cylinder.
25	H10408	103 ½"	8U-8FJX, 2 Ea.	From 8MB-8MJ (A Port) of Hitch Manifold to T8MB-8MJ-8MJ Tee Rear Port of Hitch Cylinder.
26	H10408	110"	8U-8FJX, 2 Ea.	From (T Port) on Hitch Manifold to Top 1 st Port Return Manifold.
27	H42508	185"	8U-8FJX & 90D8U-8FJX	From 90D8MB-8MJ on Right-Hand Port of Pressure Manifold to (P Port) of Hitch Manifold.
28	PiP-53310	41 ½"	PURCHASED HOSE	From Left-Hand Port on Sunstrand Pump to Left Port of Sunstrand Motor.
29	H10412	36"	12U-12FJX, 2 Ea.	Sunstrand Pump Case Bleed Port to Sunstrand Motor Top Case Bleed Port.
30	H10420	48"	20U-20FJX, 2 Ea.	From Sunstrand Pump (Drive Pump) Suction Port to Left-Hand 2-Filter Assembly OUT Port.
31	H10420	29"	20U-20FJX, 2 Ea.	From IN Port on 2-Filter Assembly to Left Shut Off Gate Valve on Hydraulic Tank.
32	H10416	60"	16U-16FJX, 2 Ea.	From Suction Screen on Top of Hydraulic Tank to Front Port on Power Steering Pump on Engine.
33	H10412	32"	12U-16FJX & 12U-12FJX	From Compensator Valve on Belt Drive Pump to T12MP-12MJ-12MJ Tee on Hydraulic Tank.
34	SPARE			
35	SPARE			
36	H10412	18"	12U-12FJX, & 90D12U-12FJX	From Right-Hand Back Port of Belt Pump (Case Bleed) to Tee on Front Right-Hand Side Hydraulic Tank.
37	SPARE			
38	H24504	90"	4U2-4FJX, 2 Ea.	From T Port of Priority Valve to Top Front Port of Return Manifold.
39	SPARE			
40	H10412	116"	12U-12FJX, 2 Ea.	From Sunstrand Motor Case Bleed Port to Traction Filter Assembly on Hydraulic Tank.
41	PiP-53269	43"	PURCHASED HOSE	From Right-Hand Port on Sunstrand Pump to Right-Hand Port on Sunstrand Motor.
42	H10408	110"	8U-8FJX, 2 Ea.	From (T Port) on Chip Box Hydraulic Manifold to Center Top Return Manifold.
43	PiP-53328	111"	PURCHASED HOSE	From Left-Hand Port of Oil Cooler to Rear Port of Return Hydraulic Manifold.
44	PiP-53327	130"	PURCHASED HOSE	From Right-Hand Port of Oil Cooler to IN Port of 3-Filter Assembly.
45	SPARE			
46	SPARE			
47	H10420	23"	20U-20FJX, 2 Ea.	From OUT Port of 3-Filter Assembly to Gate Valve on Hydraulic Tank.
48	SPARE			
49	SPARE			
50	H42508	15"	8U-8FJX, 2 Ea.	From Top of Pressure Manifold to Front Pump Valve.



Table 8-6. Hydraulic/Misc. Hose and Fittings

Item No.	Hose Type	Length	Fitting	Hose Description
51	H10408	15"	8U-8FJX, 2 Ea.	From Back Port of Pump Valve to 90D8MP-8MJ on Top of Hydraulic Tank.
52	2 ½" SUCTION HOSE	30 ½"	NONE 5/8" BANDING	From Right-Hand Filter.
53	H42508	65"	8U-8FJX & 90D8U-8FJX-L	From Top Port of Steering Pump (on Engine) to 90D8MB-8MJ (P Port) on Priority Valve.
54	H10412	85"	12U-12FJX & 45D12-12FJX	From "EF" Port of Priority Valve to Bottom Front Port of Return Manifold.
55	H43012	127"	12E4-12FJX, 2 Ea.	From Front Flow Regulator on Pressure Manifold (on Conveyor) to Left Belt Motor Pressure Port.
56	H43012	133"	12E4-12FJX, 2 Ea.	From Rear Flow Regulator on Pressure Manifold (on Conveyor) to Right Belt Motor Pressure Port.
57	H24504	24"	4U2-4FJX, 2 Ea.	Right-Hand Belt Motor Case Bleed to Center Return Manifold (on Conveyor).
58	H24504	30"	4U2-4FJX, 2 Ea.	Left-Hand Belt Motor Case Bleed to Center Return Manifold (on Conveyor).
59	H10412	21 ½"	12U-12FJX, 2 Ea.	Right-Hand Belt Motor Return to Center Manifold (on Conveyor).
60	H10412	22 ½"	12U-12FJX, 2 Ea.	Left-Hand Belt Motor Return to Center Manifold (on Conveyor).
61	H10412	160"	12U-12FJX, 2 Ea.	Return Manifold (Rear Hopper) to Center Return Manifold (on Conveyor).
62	H10412	195"	12U-12FJX, 2 Ea.	Return Manifold (Front Hopper) to Center Return Manifold (on Conveyor).
63	H24504	109"	4U2-4FJX, 2 Ea.	Hydraulic Valve Manifold (in Front Valve Box) Return to Return Manifold on Front Hopper.
64	H24504	109"	4U2-4FJX, 2 Ea.	Hydraulic Valve Manifold (in Rear Valve Box) Return to Return Manifold on Rear Hopper.
65	H10408	27"	8U-8FJX, 2 Ea.	Front Auger Motor Return Hose to Return Manifold (on Front Hopper).
66	H10408	27"	8U-8FJX, 2 Ea.	Rear Auger Motor Return Hose to Return Manifold (on Rear Hopper).
67	H24504	30"	4U2-4FJX, 2 Ea.	Rear Auger Motor Case Bleed to Return Manifold (on Rear Hopper).
68	H24504	30"	4U2-4FJX, 2 Ea.	Front Auger Motor Case Bleed to Return Manifold (on Front Hopper).
69	H24504	276"	4U2-4FJX, 2 Ea.	Pressure Hose From P Port on 2-Station Manifold (on Left-Hand Conveyor) to Front Valve Box Manifold.
70	H24504	265"	4U2-4FJX, 2 Ea.	Pressure Hose From P Port on 2-Station Manifold (on Left-Hand Conveyor) to Rear Valve Box Manifold.
71	H24504	212"	4U2-4FJX, 2 Ea.	Left-Hand 4-Port Lock-Out Valve to Rear Hopper Hydraulic Cylinder (Ram End of Cylinder).
72	H24504	139"	4U2-4FJX, 2 Ea.	Left-Hand 4-Port Lock-Out Valve to Rear Hopper Hydraulic Cylinder (Housing End of Cylinder).
73	H24504	212"	4U2-4FJX, 2 Ea.	Right-Hand 4-Port Lock-Out Valve to Front Hopper Hydraulic Cylinder (Ram End of Cylinder).



Table 8-6. Hydraulic/Misc. Hose and Fittings

Item No.	Hose Type	Length	Fitting	Hose Description
74	H24504	139"	4U2-4FJX, 2 Ea.	Right-Hand 4-Port Lock-Out Valve to Front Hopper Hydraulic Cylinder (Housing End of Cylinder).
75	H24504	25 ½"	4U2-4FJX, 2 Ea.	Pressure Port on 2-Station Manifold (on Conveyor) to Left-Hand 4-Port Lock-Out Valve.
76	H24504	25 ½"	4U2-4FJX, 2 Ea.	Pressure Port on 2-Station Manifold (on Conveyor) to Left-Hand 4-Port Lock-Out Valve.
77	H24504	29"	4U2-4FJX, 2 Ea.	Pressure Port on 2-Station Manifold (on Conveyor) To Right-Hand 4-Port Lock-Out Valve.
78	H24504	29"	4U2-4FJX, 2 Ea.	Pressure Port on 2-Station Manifold (on Conveyor) to Right-Hand 4-Port Lock-Out Valve.
79	H24508	223"	8U-8FJX, 2 Ea.	Front Flow Control Valve (Right-Hand Conveyor) to Front Auger Motor (Pressure).
80	H24508	279"	8U-8FJX, 2 Ea.	2 nd Flow Control Valve Right-Hand Conveyor (from Front) to Rear Auger Motor (Pressure).
81	H24504	59"	4U2-4FJX & 90D4U2-4FJX	From Port on Rear Valve Box Manifold to Port on Rear Cam Motor.
82	H24504	70"	4U2-4FJX & 90D4U2-4FJX	From Port on Rear Valve Box Manifold to Port on Rear Cam Motor.
83	H24504	59"	4U2-4FJX & 90D4U2-4FJX	From Port on Front Valve Box Manifold to Port on Front Cam Motor.
84	H24504	70"	4U2-4FJX & 90D4U2-4FJX	From Port on Front Valve Box Manifold to Port on Front Cam Motor.
85	H24508	42"	8U-8FJX & 90D8U-8FJX	Pressure From P Port (on Front Center Pressure Manifold) to P Port on 2-Station Manifold on Left-Hand Conveyor.
86	H24508	47"	8U-8MJ & 90D8U-8FJX-L	Return From T Port on 2-Station Manifold (Left-Hand Conveyor) to Return Manifold on Right-Hand Side Chipper Frame.
87	H24504	10"	4U2-4FJX, 2 Ea.	From Port on Right-Hand Side Hydrostatic Pump to Right-Hand Port on Shuttle Valve.
88	H24504	10"	4U2-4FJX, 2 Ea.	From Port on Left-Hand Side Hydrostatic Pump to Left-Hand Port on Shuttle Valve.
89	H24504	53"	4U2-4FJX, 2 Ea.	From Port on Hydrostatic Motor EDC Valve to Center Port of Shuttle Valve.
90 4-WD	H24504	124"	4U2-4FJX & 90D4U2-4FJX	Pressure Hose From Master Cylinder to Brake Tee Center (Rear Axle).
91 4-WD	H24504	54"	4U2-4FJX & 90D4U2-4FJX	From Brake Tee (Left-Hand) to Rear Axle Left-Hand Brake.
92 4-WD	H24504	58"	4U2-4FJX & 90D4U2-4FJX	From Brake Tee to Rear Axle Right-Hand Brake.
93	H24504	146"	4U2-4FJX, 2 Ea.	From Pressure Port 2-Station Manifold (Hitch) to Cylinder (Ram End) Hitch Raise Cylinder.
94	H24504	156"	4U2-4FJX, 2 Ea.	From Pressure Port 2-Station Manifold (Hitch) to Cylinder (Housing End) Hitch Raise Cylinder.
95	H24504	31"	4U2-4FJX, 2 Ea.	Return From T Port 2-Station Hitch Manifold to Port on Cooler Motor (DM-8).
96	H24504	31"	4U2-4FJX, 2 Ea.	Pressure From P Port 2-Station Hitch Manifold to Port on Cooler Motor (DM-8).



Table 8-6. Hydraulic/Misc. Hose and Fittings

Item No.	Hose Type	Length	Fitting	Hose Description
97	H10408	40"	8U-8FJX & 90D8U-8FJX	From Port on Cooler Pump to Port on Funk Transfer Case.
98	H10408	49"	8U-8FJX & 45D8U-8FJX	From Port on Oil/Water Cooler to Port on Funk Transfer Case.
99	H10408	9"	8U-8FJX & 90D8U-8FJX	From Port on Cooler Pump to Port on Oil/Water Cooler.
100	H06908	210"	6.5U-8FJX, 2 Ea.	Port on Oil/Water Cooler to Port on Engine Cooling System.
101	H06908	144"	6.5U-8FJX, 2 Ea.	Port on Oil/Water Cooler to Port on Engine Cooling System.
102	H24508	124"	8U-8FJX & 45D8U-8FJX	From Pressure Manifold on Center of Hydraulic Tank to Flow Control Valve Manifolds on Right-Hand Conveyor.
103	PiP-53382	140 1/16"	PURCHASED HOSE, 1 1/4"	From Compensator Valve on Belt Pump to Flow Control Valve Manifolds on Right-Hand Conveyor.
104	H10416	72"	16U-16FJX & 90D16U-16FJX	Suction Port on Power Steering/Cooler Pump on Cummins Engine to Strainer on Hydraulic Tank.
105	H10412	90"	12U-12FJX & 90D12U-12FJX	Port on Power Steering/Cooler Pump on Cummins Engine to Bottom Port Return Manifold on Frame.
106	PiP-53391	85"	PURCHASED HOSE 1 1/2"	Return from Return Manifold on Left-Hand Conveyor to Return Manifold on Right-Hand Frame.

Table 8-7. Hydraulic System Parts and Fittings Chart

Item No.	Description	Part Number	Qty
A	90° 3/8" Male Pipe X 5/16" Push On	90D6MP-5PL	1
B	90° 1/2" Female Pipe X 1/2" Male Jic	90D8FP-8MJ	1
C	Tee 1/4" Female Jic X 1/4" Male Jic X 1/4" Male Jic	T4FJX-4MJ-4MJ	1
D	3/8" Male O-Ring X 1/4" Male Jic	6MB-4MJ	4
E	90° 1/2" Male Jic X 1/2" Male Pipe	90D8MJ-8MP	5
F	Tee 1/4" Male Jic X 1/4" Male Jic X 1/4" Male Jic	T4MJ-4MJ-4MJ	1
G	90° 3/8" Male O-Ring X 1/4" Male Jic	90D6MBMJ	4
H	90° 1/4" Male O-Ring X 1/4" Male Jic	90D4MB-4MJ	9
I	1/2" Male O-Ring X 1/2" Male Jic	8MB-8MJ	18
J	1/2" Male O-Ring X 1/4" Male Jic	8MB-4MJ	3
K	Cap 1/4" Female Jic	C4FJ	6
L	90° 1/4" Male O-Ring X 1/2" Male Jic	90D8MB-8MJ	9
M	Tee 1/4" Male O-Ring X 1/4" Male Jic X 1/2" Male Jic	T8MB-8MJ-8MJ	2
N	3/8" Male O-Ring X 1/2" Female O-Ring	6MB-8FB	2
O	90° 3/8" Male O-Ring X 1/2" Male Jic	90D6MB-8MJ	2
P	1 1/4" Close Nipple	FIT-28006	2
Q	1 1/4" Gate Valve	VLV-29250	2
R	1 1/4" Male Jic X 1 1/4" Male Pipe	20MJ-20MP	3
S	1 1/2" Male O-Ring X 1 1/4" Male Jic	24MB-20MJ	3
T	1 1/2" Male O-ring X 1 1/4" Male Jic	90D24MB-20MJ	1
U	1" Male Jic X 1" Male Pipe	16MJ-16MP	1
V	45° 1" Flange X 1" Male Jic Code 62	45D16FG-16MJ	1
W	3/4" Male O-Ring X 3/4" Male O-Ring Union	12MB-12MB	2
X	Belt Flow Control Valve	VLV-51811	4
Y	90° 3/4" Male O-Ring X 3/4" Male Jic	90D12MB-12MJ	8
Z	Belt On/Off Sol. Valve	VLV-53444	4
AA	1/2" Male Jic X 1/2" Male Pipe	8MJ-8MP	1
AB	1" Male O-Ring X 1" Male Jic	16MB-16MJ	2
AC	Tee 1/2" Male Jic X 1/2" Male O-Ring X 1/2" Male Jic	T8MJ-8MJB-8MJ	3
AD	1" Male O-Ring X 1/2" Female O-Ring	16MB-8FB	1
AE	1/2" Female Jic Cap	C8FJ	2
AF	1" Flange X 1" Male Jic Code 62	16FG62-16MJ	1
AI	1" Flange Clamp code 62	16FG62	6
AJ	3/4" Male O-Ring X 3/4" Male Jic	12MB-12MJ	4
AK	Elbow, Belt Drive Pump	FIT-60616	1
AL	Tee 3/4" Male Pipe X 3/4" Male Jic X 3/4" Male Jic	T12MP-12MJ-12MJ	1
AM	Filter Piping Assembly	FTR-51534	1

Table 8-7. Hydraulic System Parts and Fittings Chart

Item No.	Description	Part Number	Qty
AN	Traction Drive Filter Assembly	HSG-51738	1
AO	1 ¼" 90° Street Elbow	FIT-28241	1
AP	90° ¾" Male Jic X ¾" Male Pipe	90D12MJ-12MP	1
AQ	Chipper Pump/Start Up Valve Assembly	MCH-60984	1
AR	¾" Male O-Ring Plug	P12MB	1
AS	½" Male O-Ring Plug	P8MB	1
AT	Bushing ¼" Female Pipe X ½" Male O-Ring	4FP-8MB	1
AU	Fan Switch Oil Cooler 150°	ELC-51660	1
AV	1 ¼" Male O-Ring X 1 ¼" Male Jic	20MB-20MJ	1
AW	¾" Male O-Ring X ¼" Female O-Ring	12MB-4FB	1
AX	¼" Male O-Ring X ¼" Male Jic	4MB-4MJ	4
AY	½" Male O-Ring X ½" Male Jic	10MB-8MJ	2
AZ	Pump Steering/Cooler (Gear) Chipper	PMP-53412	1
BA	Compensating Pressure Pump	PMP-51618	1
BB	Belt Drive Motor 22.84 CI	PMP-51619	2
BC	Sunstrand Pump 90R	PMP-53230	1
BD	Sunstrand Motor 51V	PMP-53231	1
BE	Hitch Cylinder	CYL-60651	1
BF	90° 1" Flange X 1" Male Jic Code 62	90D16FG-16MJ	4
BG	45° ¾" Male Pipe X ¾" Male Jic	45D12MP-12MJ	1
BH	45° 1" Male O-Ring X 1 ¼" Male Jic	45D16MB-20MJ	1
BI	¾" Male O-Ring X ½" Male Jic	12MB-8MJ	1
BJ	90D32MJ-32MB With Pressure CK Port	FIT-53335	1
BK	90D32MJ-32MB With Temp Sealer CK Port	FIT-53336	1
BL	Temp Switch (140°) Hayden Oil Cooler	ELC-53236	1
BM	Check Valve Steering Valve	VLV-51606	2
BN	Plug ¼" Male O-Ring	P4MB	1
BO	Valve Steering Priority	VLV-51604	1
BP	Steering Control Valve	VLV-51607	2
BQ	Oil Cooler Pump (Funk Transfer Case)	PMP-52223	1
BR	Heat Exchanger Oil/Water	PMP-51925	1
BS	Funk Transfer Case	PTM-53160	1
BT	Manifold Pressure Forward (Conveyor)	MSC-53280	2
BU	Manifold Sub Plate Valve (Valve box)	VLV-51613	2
BV	Auger Motor	PMP-51625	2
BW	Motor Hydraulic Cam Gear Box	PMP-53160	2
BX	Manifold Hydraulic Return (Small) Hopper	MSC-53358	2

Table 8-7. Hydraulic System Parts and Fittings Chart

Item No.	Description	Part Number	Qty
BY	Cylinder Hopper Extend And Retract	CYL-53700	2
BZ	Lock-Out Valve 4-Port	VLV-22333	2
CA	Manifold Hydraulic Return (Belt/Auger) Forward	MSC-53376	1
CB	Oil Cooler Motor (Funk Transfer Case)	PMP-80322	1
CC	Shuttle Valve (Sunstrand Pump)	VLV-53237	1
CD	Hitch Raise Cylinder	CYL-53333	1
CE	Manifold Hydraulic Return (Frame)	MSC-53371	1
CF	Manifold Hydraulic Pressure (Forward on Hydraulic Tank)	MSC-51600	1
CG	Manifold Hydraulic Hitch/Hopper	MSC-51621	2
CH	Manifold Brake Tee	MSC-53268	1
CI	90° ¼" Male O-Ring X ¼" Male Jic	90D4MB-4MJ	6
CJ	90° ½" Male O-Ring X ¼" Male Jic	90D8MB-4MJ	10
CK	90° 3/8" Male Pipe X ¼" Male Jic	90D6MP-4MJ	5
CL	3/8" Male Pipe X ½" Male Jic	8MJ-6MP	1
CM	3/8" Male Pipe X ¼" Male Jic	4MJ-6MP	2
CN	45° ¾" Male O-Ring X ¾" Male Jic	45D12MB-12MJ	1
CO	90° 1" Male O-Ring X ¾" Male Jic	90D16MB-12MJ	3
CP	¼" Male Pipe X ¼" Male Jic	4MJ-4MP	2
CQ	90° ¼" Male Pipe X ¼" Male Jic	90D4MJ-4MP	2
CR	45° ¼" Male Pipe X ¼" Male Jic	45D4MJ-4MJ	2
CS	45° ¾" Male O-Ring X ½" Male Jic	45D12MB-8MJ	4
CT	5/8" Male O-Ring X ¼" Female O-Ring Bushing	10MB-4FB	4
CU	2" Male O-Ring x 1 ½" Female O-Ring Bushing	32MB-24FB	1
CV	45° 1 ½" Male O-Ring X 1 ½" Male Jic	45D24MB-24MJ	1
CW	1 ½" Male O-Ring Plug	P24MB	1
CX	1 ¼" Male O-Ring X 1-1/4" Male O-Ring Union	20MB-20MB	1
CY	45° ¼" Male O-Ring X ¼" Male Jic	45D4MB-4MJ	1
CZ	90° ¾" Male Pipe X ½" Male Jic	90D12MB-8MJ	1
DA	3-Filter Head Assembly	FTR-51731	1
DB	2-Filter Head Assembly	FTR-51732	1
DC	Suction Filter Housing (Cooler Pump)	HSG-53413	1





**SECTION - 9
PARTS - LIST
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**SECTION - 10
TROUBLE SHOOTING**

FIELD OPERATIONS & MAINTENANCE MANUAL

MODEL BC-2002/CRC TANDEM/CHIP SPREADER

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