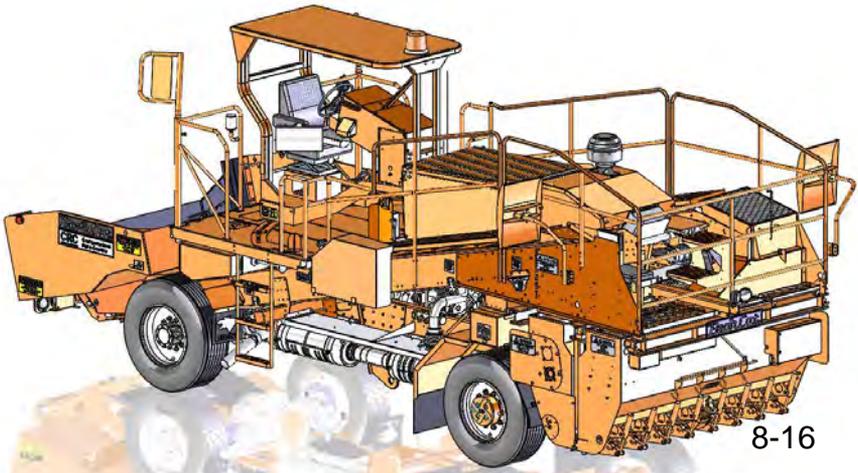


INSTRUCTION MANUAL

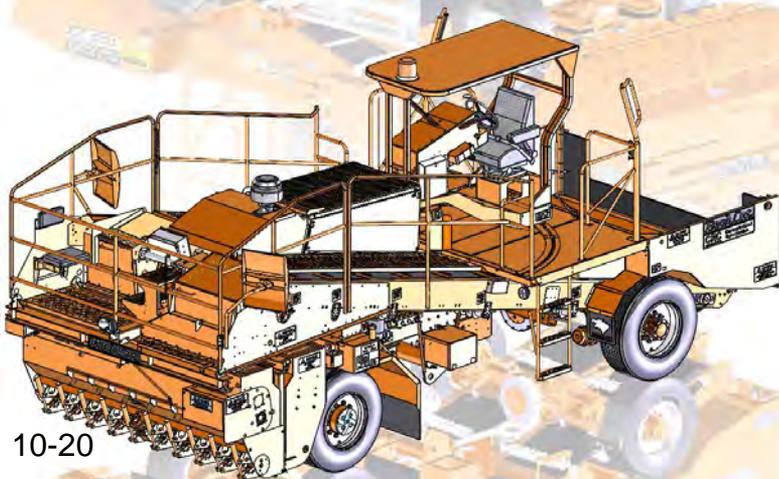


2016

Tandem Chip Spreader



8-16



10-20

2016

Revision 04/16

Software Version 218

Unit Serial Number: _____

FCAL # _____

Front Hopper ID # _____

Date of Service: _____

Customer: _____

Training Performed By: _____

I Have Received _____ Hours Training

Signature: _____

This manual describes the BC-2013/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. For the latest version of this manual, download and print:

[www.bearcatmfg.com/pdf/Chipper\(2016\).pdf](http://www.bearcatmfg.com/pdf/Chipper(2016).pdf)



WARRANTY AND CLAIM PROCEDURES

LIMITED WARRANTY

BearCat Mfg. (hereinafter referred to as “BearCat”) extends to the original purchaser-user of the Model BC-2016/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.

BearCat Mfg.
3650 Sabin Brown Road
Wickenburg, AZ 85390
Phone: (928) 684-7851
www.bearcatmfg.com

2016

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 shall notify BearCat of any defect within this warranty no later than fifteen (15) 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 thirty (30) days to the address provided below for inspection with transportation charges prepaid to BearCat.

BearCat Mfg.

3650 Sabin Brown Road
Wickenburg, AZ 85390

Phone: (928) 684-7851

Fax: (928) 684-3241

4. BearCat determines the defective part failed under the terms of the above warranty.
5. Warranty coverage will not be applied unless the requirements listed above are met.

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 bear only the warranty made by the manufacturer of that product.



INTRODUCTION

BearCat Chip Spreaders (Model 2016/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 2016/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
BTU	British Thermal Units
CCW	Counter Clockwise
CFM	Cubic Feet per Minute
CRC	Computerized Rate Control
CW	Clockwise
FCAL	Footage Calibration
FPM	Feet per Minute
GCAL	Gallons Calibration
GPM	Gallons per Minute
KgSM	Kilograms per Square Meter
LPM	Liters per Minute
LSM	Liters per Square Meter
MPM	Meters per Minute
PSI	Pounds per Square Inch
PSY	Pounds per Square Yard
PTO	Power Take Off
RPM	Revolutions per Minute
WET	Emulsified asphalt or containing water
T3	Tier 3 Engine
T4	Tier 4 Engine
8'	8' to 16' Tandem Chipper
10'	10' to 20' Tandem Chipper

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SAFETY PRECAUTIONS

Personal Safety

1. 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

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

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against any part of your body.

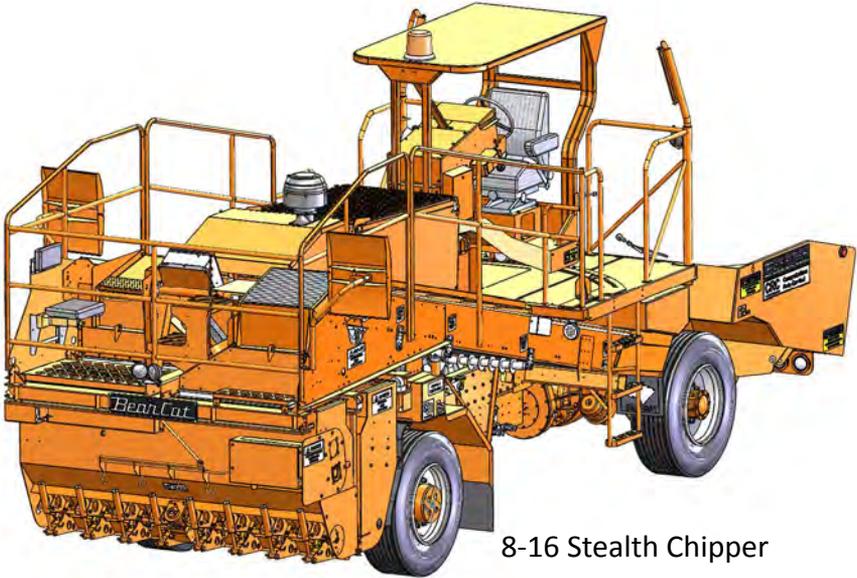
- Engage the parking brake and place both the mechanical transmission and the hydrostatic transmission in neutral before leaving the machine.
- Stop the engine before crawling under the machine.
- Keep the surface of the hydraulic oil cooler clear of obstructions.

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

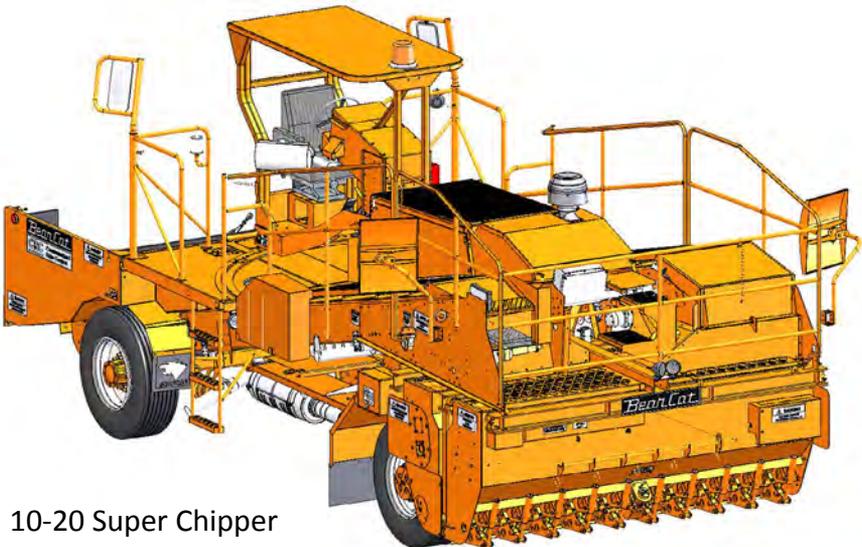


Equipment Description

The following description of the equipment should be read for familiarity with the operating features and capabilities of the Tandem Series Chippers. Shown below are both the 8'-16' and the 10'-20' Chippers.



8-16 Stealth Chipper

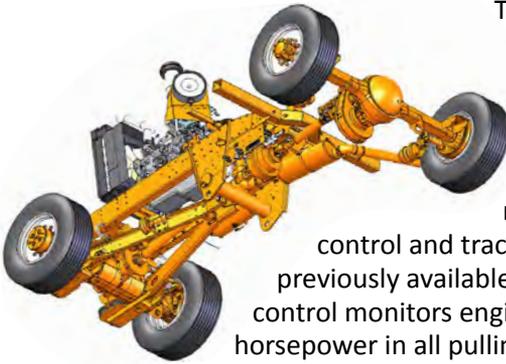


10-20 Super Chipper

2016

Power Train

Tandem Series Chippers are equipped with a Cummins Tier3 QSB6.7L 6-cylinder diesel engine. The engine crankshaft is coupled to a 130cc variable displacement axial-piston, high torque hydrostatic pump, that drives a 160cc variable displacement hydrostatic transmission and two-speed transfer case which mechanically drives a limited-slip front axle. The transfer case has a rear output for a rear drive axle in the optional four wheel drive unit.



The particular configuration of the Chipper 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. The automotive drive control monitors engine RPM to maintain peak horsepower in all pulling conditions.

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. This function also doubles the control resolution giving the operator better or less sensitive movement control.

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

Conveyors

Tandem Super Chipper 10'-20' employs two hydraulically driven 30-inch wide conveyor belts and the Tandem Stealth Chipper 8'-16' employs two hydraulically driven 20-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 4x the volume of rock as a conventional flat belt. The belt motion is controlled by servo-actuated valves that receive signals from level-sensing ultra-sonic sensors mounted at the top of each spread hopper.

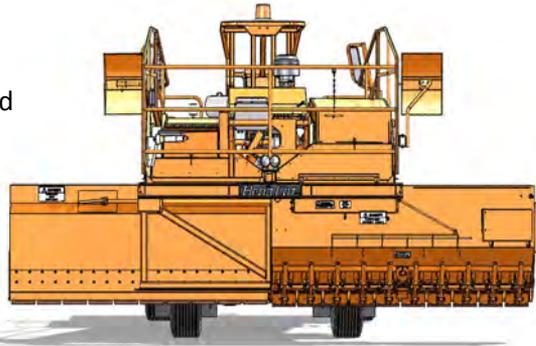


NOTE: Optional belts are rated at 350 °F (for use with hot aggregate).

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.

Spread Hopper

Tandem Chipper is equipped with two separate (front [left] and rear [right]) spread hoppers that can be quickly extended from a minimum width of 8 feet to a maximum width of 16



feet for the Stealth Chipper and a minimum 10 feet to a maximum width of 20 feet for the Super Chipper.

Hopper extension and retraction is controlled from the operator's station or from an optional 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 in one foot increments from 1 foot to the maximum 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. 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 completely retracted 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 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

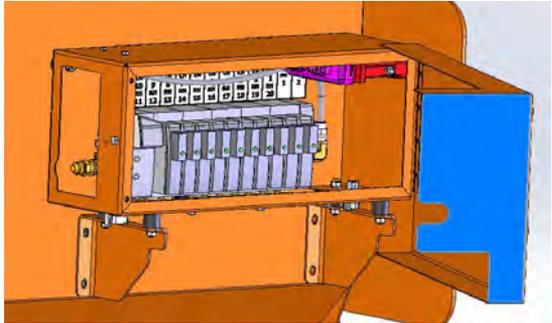
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wear or limit production.

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 Tandem Chipper 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.



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.

Computerized Rate Control (CRC)

Tandem Chipper employs an on board 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:

- a. Constantly measures the actual rate at which aggregate is being delivered
- b. Correlates the actual rate with the travel speed of the chip spreader
- c. 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



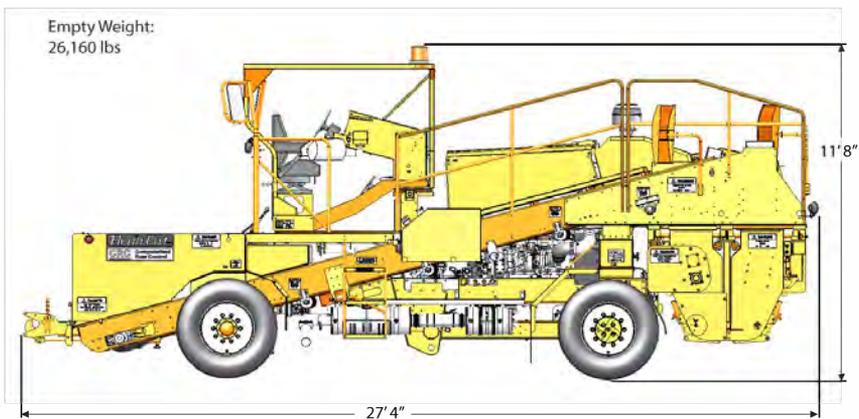
flow rate) to maintain the desired rate at all times. The system automatically adjusts the aggregate flow through the spread hopper gates.

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.



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Chassis

The chassis members are channel steel, bolted rather than welded, for maximum repair-ability.

The length of the chassis permits a wheelbase of 158.5 inches. This length, in combination with rubber spring suspension on the front axle, assures smooth, steady control.



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.



Operator Control Station Layout

Operators should thoroughly understand the functions of all of the control panel switches.



CONTROLS

DASH PANEL

1 Pre-Heat

When starting the diesel engine, turn key one position CW & wait until this light is out, than proceed to start engine.

2 4 x 4

Four Wheel Drive, (Optional Equipment) switch will engage and dis-engage the rear axle by using a drive-line disconnect. A load on the drive train can inhibit the shifter from operating. Rocking the back and forth gently may help slack the load and permit shifting.

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.

4 EMERGENCY FLASHER

Turns on emergency flashers so all four directional lights will be flashing.

5 LEFT TURN LAMP

Left hand turn signal indicator.

6 PARK BRAKE

PULL OUT: Releases the air pressure to the brake actuators to apply the spring actuated parking brakes.

PUSH IN: Will apply air pressure to the parking brake actuators to release the parking brakes.

ALWAYS APPLY PARKING BRAKES BEFORE LEAVING THE OPERATOR SEAT!



2016

7 ACC. POWER

12Vdc accessory power: This is a standard 12Vdc accessory socket with a maximum 3 amps current draw.

8 IGNITION

Chip spreader engine start and ignition system. On the Console, the FWD-REV must be in NEU (Neutral) and the Cruise Control must be OFF to start.

9 RIGHT TURN LAMP

Right hand turn signal indicator.

10 LOW/LOCK

ON: Locks the hydrostatic drive motor in full displacement, (max. speed is about 60% \approx 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.

11 TRANSFER-CASE

Switch operates an air cylinder that shifts the Transfer Case. Use finesse when shifting between ranges and never shift while moving. Shift to N (neutral) before shifting into the next range. Check neutral by the indicator light on the Display and by trying to drive the machine. A load on the drive train can inhibit the shifter from operating. Rocking the back and forth gently may help slack the load and permit shifting.

LO: (Low range).

N: (Neutral).

HI: (High range).

12 BEACON

Turns amber warning beacon on and off.

13 WORK LIGHTS

ON: Working lights, front, side & rear.

OFF: Turns work lights off.

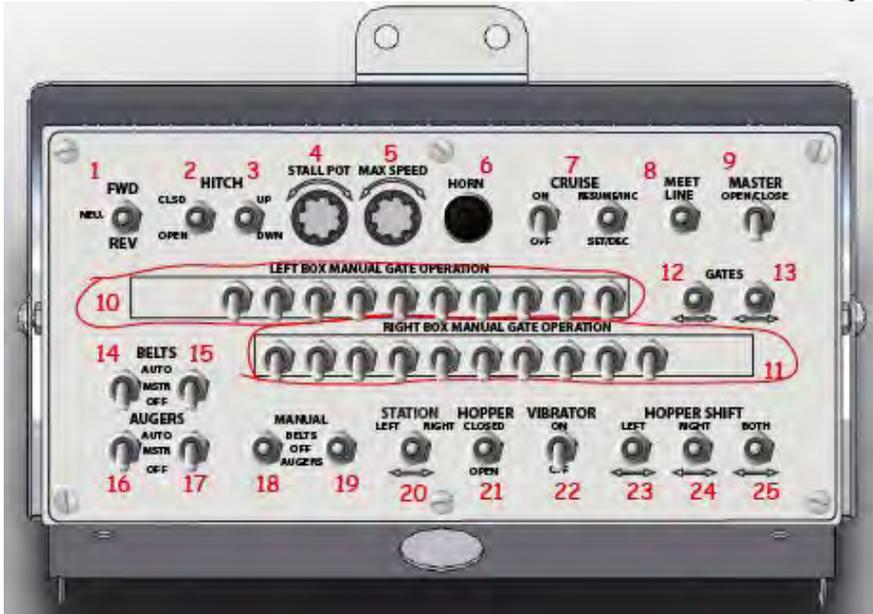
14 HEADLIGHTS

ON: Turns headlights, tail lights, and clearance lights on.

OFF: Turns lights off.

15 DISPLAY

This computer display, is used to display chip spreader functions, set-up and some engine parameters



CONSOLE

1 FWD-REV.

FWD: (Forward) The hydrostatic drive system will move the chip spreader forward.

NEU: (Neutral) The hydrostatic drive system will not operation.

REV: (Reverse) The hydrostatic drive system will move the chip spreader reverse.

NOTE: this switch must be off while starting the engine!

2 HITCH

OPEN: Used to open the hitch.

CLOSED: Used to close the hitch.

3 HITCH LIFT

(Optional Equipment)

UP: Moves the hitch up.

DOWN: Moves the hitch down.

4 STALL POT

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.

5 MAX SPEED

Sets the maximum travel speed when the throttle is fully depressed.

6 HORN

PUSH: Press the button to activate the horn.

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7 CRUISE CONTROL

(Optional Equipment)

ON: Turns the power on for the cruise control.

SET/DEC: Sets the desired speed. You must be in forward, stepping on the accelerator pedal, and moving above 200FPM.

NOTE: this switch must be off while starting the engine!

8 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, back up to get the next truck, as you come back forward to the start line the CRC system will automatically re-open the gates.

9 MASTER

ON: Opens all the selected chip box gates. When the master switch is selected the CRC system will total distance covered.

10 LEFT BOX Manual Gate Operation (Optional)

ON: Selects gates to open with MASTER.

OFF: Closes gate.

11 RIGHT BOX Manual Gate Operation (Optional)

ON: Selects gates to open with MASTER.

OFF: Closes gate.

12 GATES (Taper Cut from left)

Shifting (left) switch to the right you can close gates in sequence.

Shifting (left) switch to the left you can open gates in sequence.

13 GATES (Taper Cut from right)

Shifting (right) switch to the left you can close gates in sequence.

Shifting (right) switch to the right you can open gates in sequence.

14 LEFT BELT CONTROL

OFF: Belts off.

MSTR: Auto belt control when MASTER switch is ON.

AUTO: Auto belt control.

15 RIGHT BELT CONTROL

OFF: Belts off.

MSTR: Auto belt control when MASTER switch is ON.

AUTO: Auto belt control.

16 LEFT (FRONT) AUGER

OFF: Augers off.

MSTR: Auto auger control when MASTER switch is ON.

AUTO: Auto auger control.

17 RIGHT (REAR) AUGER

OFF: Augers off.

MSTR: Auto auger control when MASTER switch is ON.

AUTO: Auto auger control.

18 MANUAL LEFT BELT & AUGER

UP: Manually runs the left belt.

DOWN: Manually runs left auger.

Turn Off
To Start
Engine



19 MANUAL RIGHT: BELT & AUGER

UP: Manually runs the right belt.

DOWN: Manually runs right auger.

20 STATION SHIFT

Left: Moves the operator station to the left.

Right: Moves the operator station to the right.

21 HOPPER

(Optional Equipment)

Close: Folds the receiving hopper up for travel.

Open: Unfolds the receiving hopper for operation.

22 VIBRATOR

(Optional Equipment)

ON: Turns on Hopper Vibrator with MASTER.

OFF: Turns off Vibrator.

23 HOPPER SHIFT LEFT

Left: Extends left (front) spread hopper out.

Right: Retracts left spread hopper in.

24 HOPPER SHIFT RIGHT

Right: Extends right (front) spread hopper out.

Left: Retracts right spread hopper in.

25 HOPPER SHIFT BOTH

UP: Extends both left (front) and right (rear) spread hoppers simultaneously.

DOWN: Retracts both left (front) and right (rear) spread hoppers simultaneously.

SPECIFICATIONS	
Hydrostatic Drive System	
Type	Front-wheel drive. (14.769:1 planetary)
Transmission	Axial piston variable rate high torque hydrostatic pump directly coupled to engine; variable rate hydraulic motor drives axle through 2-speed transfer case. 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). 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.
Transfer Case	2-Speed, high (1.613:1) and low range (4.14:1), air shift.
Operating Mode	LOW Range (0-600 FPM) (Low-Lock engaged, 0-300 FPM). HIGH Range (0-1600 FPM) (18 MPH) (Low-Lock engaged, 0-700 FPM). NOTE: In low range the unit will pull a fully loaded 15 cubic yard dump truck up a 15% grade from a dead stop.
Diesel Engine	Cumins 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
Frame	Main: 10 1/8 in. X 3 1/2 in. channels. Cross members: 10 in. X 3 in. channels
Rear Axle	
2-WD	Solid trailer axle (5 in. diameter tube)



4-WD	Rear drive axle. Gear ratio (5.625:1) thru a (2.625:1) chain drive reduction box for an overall (14.769:1), solid mount
Rating (both)	25,000 lb
Front Axle	
Type	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
Rating	35,000 lb
Steering	
Type	Hydraulically powered orbital
Control	Hand wheel; no mechanical linkage
Brakes	
Front	Wet disc, air over hydraulic
Rear	16.5 in. X 7 in. drum S-cam air brake, Anchorlok parking brake
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 load-sensing closed-center steering valve
Receiving Hopper	
Width	10 feet
Struck Capacity	4.5 cubic yards (3.44 cubic meters); includes rubber skirting to prevent spilling
Spread Hopper	
Width	8 feet or 10 feet (each)

2016

Capacity Total	3.8 cubic yards (2.9 cubic meters)
Spread Width	1 to 16 feet or 1 to 20 feet.
Spread Rate Range	1-160 lbs per-square-yard
Spread Rate	Computer controlled CRC system
Control	
Cut-Off Gates	Electro-pneumatic powered; 12 inches wide; infinite gate opening adjustment and preset capability from operator's station
Conveyors	
Belt Width	20 in or 30 in.
Trough Angle	30°
Belt Rating	2-ply
Drive	Independent hydraulic motors
Motion Control	By solenoid valves through spread hopper-mounted level sensors
Conveyor	Lined on each side; self-cleaning tail pulleys and return rollers; hooded deflectors at each head pulley
Protection	
Operator's Station	Adjustable cushioned seats with adjustable suspension; 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	80-gallon fuel tank; deck-mounted tool boxes under seats
Equipment	
Over All Dimensions	With spread hoppers retracted and standard tires
Length	27 feet
Width	8 feet or 10 feet



Height	9 feet 3 in.
Weight	26,160 lbs.
Ground Clearance	10 in.
Wheel Base	13 feet 2 1/2 in.
Turning Radius	19.5 feet
Front Approach Angle	18°
Rear Approach Angle	20°

2016 DISPLAY



Display Software Version 414

Home Page

Side Buttons

1 PSY (Pounds per Square Yard)

Spread rate or quantity of aggregate spread per square yard. In Metric it is KgSM (Kilograms per Square Meter). Button 1 highlights or selects the rate for adjustment. Use the Inc-Dec switch on the Console or the up and down arrows (#21) to change the rate.

2 Cam % Open

Cam controls the opening of the spread gates on the left (L%) and right (R%) hoppers. Shown is the percentage of opening. Pressing Button 2 selects CRC (Computerized Rate Control), Man (Manual) or Off. Man (manual) enables operator control of the % of cam opening. Off disables the cam for transport or “roading” of machine.

3 Gate Clear

Pressing and holding button 3 overrides “CRC” cam control and opens cam to clear debris. Releasing button returns cam to CRC position.



4 N/A

5 Total Feet and Sq. Yards

Engine Hours accumulates hours of the life of the engine. Total Feet accumulates the total distance spread. Sq. Yards accumulates the total area covered. Button 5 if pressed for 3 seconds will zero the Total Feet and Sq. Yards.

6 Meet Line

When actuated on the Console, Turns off the spread and keeps track of chipper position by measurement. When the chipper crosses the point at which the meet line was actuated, it turns the spread back on. Button **6** will highlight meet line in edit mode. Use the up and down arrows to change the start distance. The higher the number, the sooner it will spread or overlap the stop line.

7 N/A

8 N/A

Display Functions

9 Transfer Case indicator

The Transfer Case Switch on the Dash selects range.

Lo: (low range).

N: (Neutral).

HI: (High range).

10 Fuel Gages.

The Color shaded area indicates the fuel level.

11 FPM

(Feet Per Minute) Displays the speed of the machine whenever moving.

Displayed as MPM (Meters per Minute) in metric.

12 Light Sensor

13 Escape Button

Use to return to the Home Page.

14 Left Taper Switch Gate Indicator

15 Right Taper Switch Gate Indicator

Both Left and Right indicate the "On or Off" status of the individual gates as selected by the Taper Switch. It does Not indicate the "On of Off" status of the optional mechanical switches.

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16 Left and Right Page Buttons

Press to move back and forth between different pages.

17 OK Button

Press to save a change or setting.

18 Up and Down Buttons

When changing a setting, press to increase or decrease a setting

Settings Menu

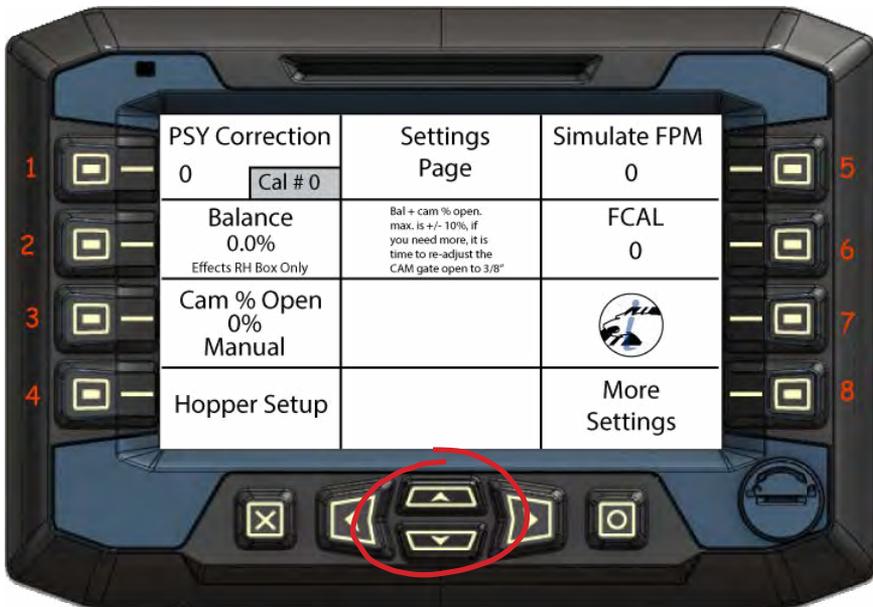
Press the Page Button and cycle through the pages to access the Settings Menu. The left or right button will take you from the Home Page to the Settings Menu and back.

Use the Numbered Buttons to select the corresponding function.



Settings Page

Pressing Numbered Buttons will select for edit.



Display

1 PSY Correction

Adjusts the cam opening, used for calibrating the cam. Edit value by pressing the **1** button, when the background is WHITE use the increase/decrease switches or the Up and Down Buttons to enter the difference between selected or desired rate and actual weight. Ex, if the actual weight is 4 lbs heavier than the display, press the down button to enter -4. If the actual is 4 lbs light then press the up button to enter 4. When done editing press the OK button.

2 Chip Box Balance

Balance only affects the right box. Adjust your spread rate (PSY) until you are happy with the left side. Then balance the hoppers with the right side. 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 pressing the **2** button, when the background is WHITE use the increase/decrease switches, when done editing press the OK button. This is a very fine adjustment that affects the entire right side. Streaking of individual gates must be adjusted at the gate. The numbers range from 0 to 100. Each number represents .01%, so be generous. Start with 10 or 20 and fine tune from there.

3 MANUAL OPEN

This set point value is used when the manual cam selection (MAN) on the home screen is made. Edit value by pressing **3**, when the background is WHITE use the increase/decrease switches, when done editing press the OK button. It is good to leave this setting around 95% for occasional gate clearing.

4 Hopper Set-up

Pressing **4** will take you to the hopper setup page covered in "Hopper Setup Page".

5 Simulate FPM On/Off

A diagnostic tool for simulating speed while sitting still or in the event of an FPM sensor failure. The default setting is CRC reading the speed sensor. To simulate FPM, press and hold **5** for 3 seconds. The CRC will now use the simulated FPM value. To return to read the speed sensor, press and hold the **5** switch again for 3 seconds, the computer will resume reading the speed sensor (CRC). NOTE: When the system is powered down and back-up it will default to reading the speed sensor (CRC).

6 FCAL

"Footage Calibration" is used to calibrate the "FPM" sensor for distance measurement. On a pre-measured distance of 1000' or more, drive the machine to align a point on the front hopper with your start mark on the ground. Turn the "Master" switch on drive the length of the pre-measured distance. Speed is not critical but drive as straight as possible. Slow down and creep to a stop near the finish line and turn the Master off. From the Home page press the right arrow to return to the Settings page. Press and hold the **6** button until the background is white and a pop up window will display your current footage. Increase number if the number of feet totaled in the CRC is lower than the actual feet traveled.

Decrease number if the number of feet totaled in the CRC is higher than the actual feet traveled.

NOTE: This number is a percentage relationship to the actual number.

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%.

7 Information

7 Button, (information logo) takes you to a Help Menu that gives instruction on the different settings.

8 More Settings

Pressing **8** will take you to the More Settings page covered in "More Setting Page"



1 Blank

2 Metric

Press **2** repeatedly to toggle Metric on or off then press OK to save.

3 Language

As the software is developed, additional languages will be optional.

4 Blank

5 Ultrasonics

Press **5** to enter the Ultrasonics Setup Page. Ultrasonics control the belts and the aggregate level in the hoppers. The Ultrasonic bounces a sound wave off of the aggregate when the level raises above the hopper grizzly. The sensor operates in a range from about 1 inch above the grizzly which would turn on the belt full speed, to an aggregate level about 4 inches above the grizzly which would be full and stop the belt. Within this 3 inch margin the sensor also controls the speed of the belt. The belt runs fast at the low level (1") and slow at the high level (4"). Temperature can affect the length of the sound wave, thus changing the level at which the belts turn on or off. High temperatures lengthen the sound wave causing the sensor to read the grizzly as the aggregate level and slowing the belt. You can adjust the high and low levels about an inch in either direction by increasing or decreasing the setting. The factory setting of 1" to 4" is the default or zero setting. 100 in either direction is about an inch. Use the numbered button to highlight the corresponding setting, and the up and

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down buttons to change, then OK to save.

6 Blank

7 Information

⑦ Button, (information logo) takes you to a Help Menu that gives instruction on the different settings.

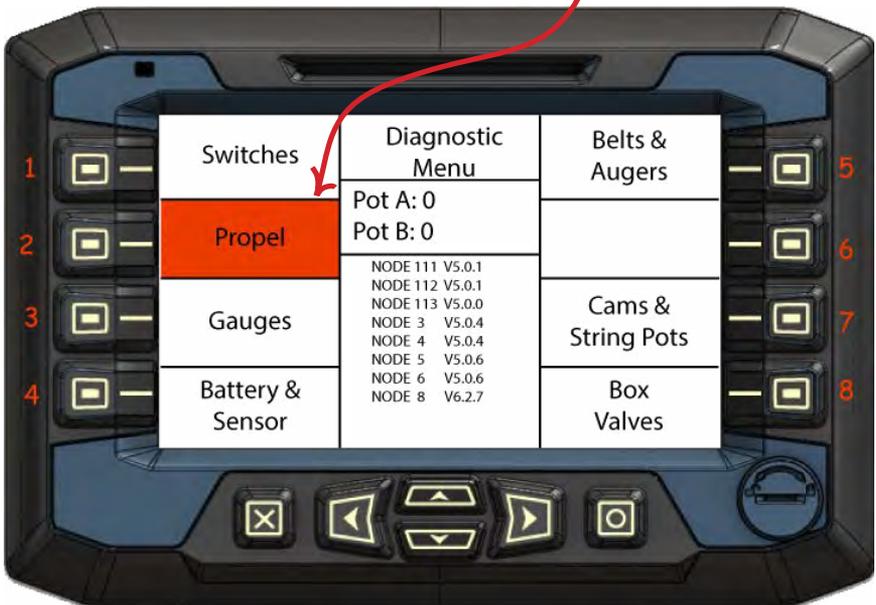
8 Back Button

Press ⑧ to return to the Settings Page.

Diagnostic Menu



From the Settings Menu, press the ② to enter the Diagnostic Menu. If an area is showing red, there is a problem.



The center of the Diagnostic Menu lists the version of software currently installed in each node.

1 Switches

Button ① will enter the Switches Page to diagnose the switches on the



Console. The switches pictured on the page represent all possible options, so your console may not have switches that are on the page. When you operate each switch, the pictured switch on the page should move as you move the switch on the Console. When diagnosing a problem, you can test the switch and the computers response to the actuation. If the switch moves on the screen as actuated, then the switch is operating properly as well as the wiring of the input circuit, and the computer is receiving the command. The problem then must be traced from the output node to the function. The Station Shift switch directly controls the hydraulic valve

2 Propel

Press **2** to enter and diagnose all aspects of the electronic side of the propulsion system. Each square has a voltage reading corresponding to each function. Below voltage the reading on the left is the status of the circuit with the appropriate level being low, high, or OK. The right side analyzes the feed back circuit with OK, or corrupt describing a bad signal or no signal. The flashing red indicates a problem.

3 Gages

Press **3** to enter and diagnose the gages and their sender outputs. Each square has a voltage reading corresponding to each function. Below voltage the reading on the left is the status of the circuit with the appropriate level being low, high, or OK. The right side analyzes the feed back circuit with OK, or corrupt describing a bad signal or no signal. The flashing red indicates a problem.

4 Battery & Sensor

Pressing button **4** will give power voltage readings for 4 of the major computer controlled junction boxes. On the left is the input voltage for the node. The decimal is missing so a reading of 146V is 14.6 volts. The right side is the controlled and protected output voltage from each node to sensors. The decimal is missing so a reading of 4976V is 4.976 volts.

5 Belts & Augers

Press **5** to enter and diagnose the Belt and Auger sensors. Each square has a voltage reading corresponding to each function. Below voltage the reading on the left is the status of the circuit with the appropriate level being low, high, or OK. The right side analyzes the feed back circuit with OK, or corrupt describing a bad signal or no signal. The flashing red indicates a problem. The Belt Valve and Auger Valve boxes light up when the function is actuated.

6 Blank

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7 Cams & String Pots

Press **7** to enter and diagnose each Cam sensor reading. The left and right Cam PPU has a voltage and hertz reading. Below voltage the reading on the left is the status of the circuit with the appropriate level being low, high, or OK. The right side analyzes the feed back circuit with OK, or corrupt describing a bad signal or no signal. The flashing red indicates a problem. The Cam Close Signal shows green when opening and red when closing. The Cam Control Command shows green when opening and red when closing. The String Pot reads voltage.

8 Box Valves

Press **8** to check computer actuation of hydraulic valves that control the hopper width and hitch. Boxes light up when the function is actuated. Like the switch diagnostic page checks the computer side of the function.

Engine

Press **3** for Engine Functions and diagnostics.



Information

Press **5** for help. Additional information and instructions can be accessed by pressing the numbered button next to the icon.



Defaults Page

Press **6** for the Defaults Page.



The Set PSY Cal (Button **4**) will reset the PSY calibration back to the initial factory setting. If you are having trouble calibrating the PSY Correction because the rate is very far off resetting to default may help.

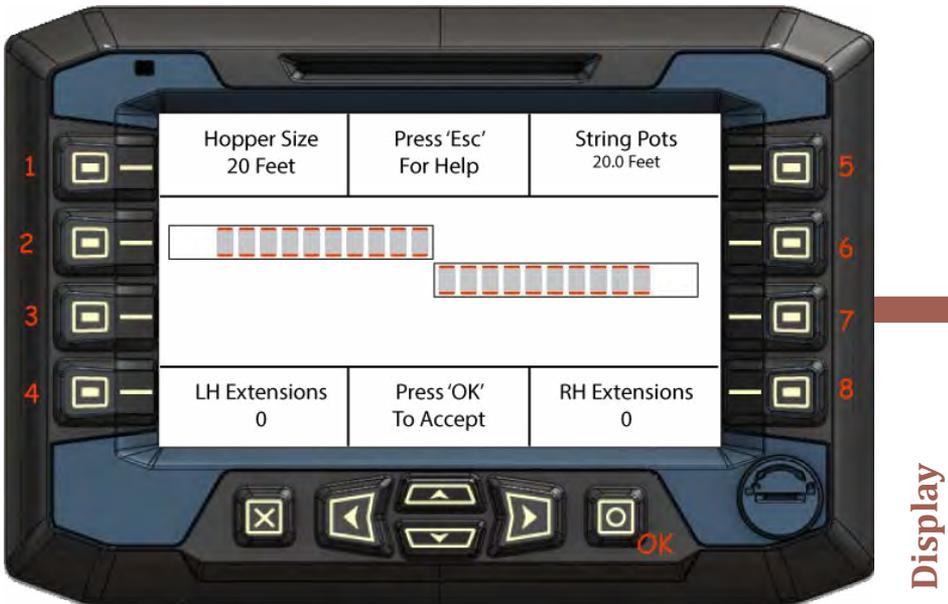


Set All Defaults (Button **8**) will reset all factory defaults. This not recommended and can cause grief. It is a factory tool to help assemblers start from scratch.





Hopper Setup Page



Press **4** on the Settings Page to setup Hopper options.

Hopper Size Refers to the combined width of the front hoppers WITHOUT extensions. This is an initial factory setting for the machine as built. Press **1** to highlight and use Up & Down buttons to correct and OK to save.

LH & RH Extensions are for bolt on extensions that add width to the main hopper. Press **4** or **8** to highlight the appropriate side and use Up & Down buttons to correct and OK to save.

String Pots inform the computer of the hopper positions in regards to width. The computer uses this information to calculate area covered and disable unused gates in the center when tapering. A faulty hopper string pot can cause the computer to think the hopper is narrower than it is and shut off center gates. To disable the String Pots, press **5** to highlight and press again to disable. This will disable the width calculation and enable all gates regardless of width.

2016 Initial Checkout of Machine

Checkout

1. Make sure all fluid levels are adequate.

	STANDARD	SYNTHETIC OPTION
Engine	Shell Rotella 15w-40	AMSOIL DME 15w-40
Engine Coolant	Prima Tech Universal Green	(AMSOIL ANT Biodegradable available)
Hydraulic	Tellus T100	AMSOIL HVJ ISO 68
Transfer Case	Shell Spirax S4 TXM	AMSOIL ATH 5W-30
Brake Master Cylinder	Rando HD46	Rando HD46
Front Axle (differential & hubs)	AMSOIL SVO 75-140	AMSOIL SVO 75-140
2 X 4 Rear Axle Hubs	Shell Spirax S4 TXM	AMSOIL SVO 75-140
4 X 4 Rear Axle Differential	Shell Spirax S4 TXM	AMSOIL SVO 75-140
4 X 4 Rear Axle Gear Box	AFT Dextron III/Mercon	AMSOIL ATF
Cam Gear Box	AMSOIL RCO 460	AMSOIL RCO 460
Fuel Tank	Diesel #2	Diesel #2

2. Engine

- d. With Engine Off, check belts, tension and wear. Pay special attention to crank pulley as belt slippage can polish and wear if belt is excessively worn.
- e. Intake Air Filter. (Dust from dirty chip can require daily replacement) DO NOT BLOW FILTER CLEAN. Inspect all air filter intake rubber connections down to turbo. Dust collecting at seams or clamp locations can indicate possible leak.

- f. Check and drain the fuel water separator for moisture.

3. Inspect air and hydraulic hoses.

- a. Check for loose or leaking fittings on hoses as well as chaffing or cracks.



4. Conveyor Belts

- a. At the rear tail pulley, Insure the belt is at approximate center of pulley.



- b. Locate and inspect belt lacing's for damage or excessive wear.
- c. Grease belt head and tail pulley bearing zerks (8 places). Do not over grease. Bearings should appear slightly greasy but not excessive.



- d. Belt tension is visually determined by the droop or sag in the belt as observed from the right and left hand side of the machine. From the bottom of the Conveyor frame, the (return) belt should sag from 1/2" to 1". DO NOT OVER TENSION BELTS.

- e. Inspect the front hopper grizzlies for debris. Make sure there is no debris build up under Ultra Sonic Sensors.



- f. Inspect and clean the underside or face of the Ultra Sonic Sensors (just wipe dust off with hand or rag).
- g. Inspect and clean the Proximity Switches or "Diaphragm Switches" in the front hoppers that control the augers.

5. Start Engine.

- a. With engine warmed up, check oil pressure and wait for air pressure to build up to 120 psi.

6. Check Hydraulic Functions.

- a. If the pressure compensated pump dump valve has not engaged at this point, it will after 10 minutes from engine start or when you activate any hydraulic function. The pressure compensated pump has a distinct "whine" or "hum" which you will recognize with more experience.

- b. Turn Belts to "Auto" and check operation. If sitting on level ground, the belts should be running in the "reasonable" center of the rear tail pulley. Parked on a slope, it is normal for the belts to drift to the downhill side. If an adjustment is required, it must be done on level ground. DO NOT ADJUST BELTS WITH ENGINE RUNNING! Make half turn adjustments to each side

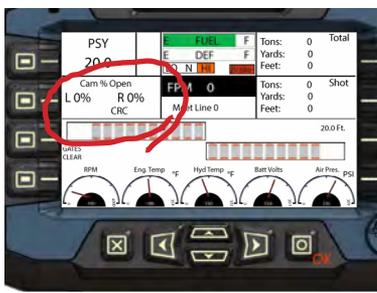
of the pulley in opposite directions so the overall belt tension does not change (if you tighten one side, loosen the other). Tightening a pulley adjustment will cause the belt to move towards the other side.

- c. Turn Augers to “Auto” and walk up conveyor to visually inspect operation.
 - d. Check hydraulic return filter gauge.
 - e. Operate Hitch “open and closed”. In time, from the operators seat you can feel the “clunk clunk” of the hitch cylinder open and close as you cannot see it. At first have a helper visually inspect the operation.
 - f. Operate the optional hitch “up and down”. You can see the hitch in the full “up” position from the operators seat.
 - g. Check the Hopper Shift, both left and right “in and out”, then “both” all the way out until fully extended. At this point leave the hoppers extended for further inspection.
 - h. With the Hoppers extended, turn off all hydraulic functions and stop the engine. Grease the cam and auger bearings. Spray the gate cylinder shafts with WD-40 or any penetrating oil that cuts asphalt. Also spray the hopper extension cylinder shafts.
 - i. Restart the machine and engage the hydraulic dump valve by turning on a belt until you hear the pressure comp pump “whine” and turn belt back off.
 - j. Check Cam operation. On the display, press the #2 button to select MAN (Manual). Use the up and down arrows on the display to increase to 95%. The L% and the R% should change as the cam moves to the set position. Press the #2 button again to select CRC (go past OFF). Cam should return to zero if you are not moving. Press the #2 button again for MAN and leave for the gate check operation.
7. Check Pneumatic Functions.
- a. If you have the optional individual gate switches on the console, turn them all on. Use the “Gates” switches to select all of the gates on the display. A gray center is selected, solid red is unselected. Use the “Master” switch to open all gates. They should make a good solid bang! Check to see that all are wide open. Turn the Master on and off a couple of times and listen for any gates that open or close slowly. Slow gates may have



asphalt built up on cylinder shaft or the cylinder shaft is bent.

- b. Open the gates and press the #2 button again to return to CRC. The L% and R% should return to zero if you are not moving. Turn the Master off to close the gates.
- c. At this point, stop the engine again but turn the ignition switch back on (without engine running).



Check gate adjustment.

- a. Turn on the Master to open the gates. With the cam at zero % the gate opening should be from 3/8" to 5/8". Use the gate adjustment bolt on the underside of the gate to adjust. Initially you set all the gates the same all the way across the hopper. Over time you may make adjustments to the individual gate openings to improve the appearance of the chip seal coverage or "mat". This will result in what appears to be uneven gates upon inspection. This is perfectly normal and varies from one material to another or maybe wheel tracking has you opening gates more over the wheel path. Every month or so it is good to re-adjust to get back to square one.
- b. Turn off the Master to close the gates and re-start the engine



Prep for Operation

- a. With the engine running and hydraulics engaged use the "station shift" to swing the operators pedestal left or right to suit. Generally it is a good practice to swing the pedestal or drive on the side of the machine that is close to the edge of the road. This puts you in a position to better see up coming obstacles like mail boxes or bridge abutments. If you do not have a radio to communicate with dump trucks, the right side is easier for them to see hand signals out of their left mirror.

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- b. With a helper, adjust the 4 mirrors to your current pedestal position. The 2 mirrors on the front are for determining the aggregate level in the front hoppers. The mirrors behind the pedestal are to observe the opposite side. By observing the opposite mirror from the pedestal seat, you should be able to see the end of the hopper on the opposite side as well as the ground underneath. Swing the pedestal and adjust for the other side. With practice you can drive and maintain meet line coverage while sitting on the opposite side watching for obstacles. The view from this mirror also gives you a couple more inches of view to see your start line underneath the hopper. Proper mirror adjustment and maintenance separates with a wide margin the good operators from the bad.

Calibration

Supplied with the machine is a tarp and a scale. The standard tarp is one square yard. Metric tarps (one square meter) are available on request. The initial calibration procedure is designed to get close to the desired application rate as far as the difference between the setting on the display and the actual rate on the ground. Use this procedure to get started, then there are more accurate methods once the operation has begun. If you calibrate or the initial calibration procedure checks to be within 3 lbs. Stop calibrating and start chipping.

- A. On the display, press the **1** button to highlight the PSY. Use the up and down arrows or the inc/dec switch on the Console to set the desired application rate.
- B. Open the hitch and back up to a loaded dump truck and close the hitch. Give a small forward tug to ensure connection.
- C. Turn the belts and augers to “auto” and have the dump truck fill the rear hopper. Allow the hopper to fill until the belts stop. Lower the dump bed and open the hitch to release the dump truck.
- D. Hang the empty tarp from the scale and adjust the spring tension to zero.
- E. Find a smooth flat area to calibrate. Swing the pedestal to the left side. Place the tarp close to the end of the run towards the left side such that you can cover it with the end of the left hopper. Do not attempt to calibrate on the right side. On the display use the “Gates” switches to turn off all but 4 feet on the left side. It



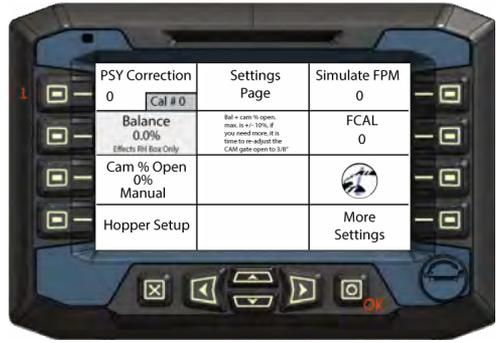
is a good practice to not use the very end gate as one of the 4 because it is typically open slightly more to make the edge of the mat more consistent.

- F. Back the chipper up about 200' from the tarp. Drive a practice run towards the tarp at a speed that feels comfortable to chip. In most cases you need to be at about 300 fpm+. It is very critical that you not change speed while covering the tarp. Drive over the tarp holding the speed then stop afterwards. If everything seems ok back up about 100' and drive towards the tarp again. It is imperative that you back up far enough so that you can see the tarp over the top of the spread hopper. This will give enough time for you to even the speed and the cam can to adjust to that speed a few seconds before reaching the tarp. Turn on the 4 gates about 2' in front of the tarp and off about 2' after the tarp. Again, it is very critical you not change speed while spreading over the tarp.
- G. If the tarp is completely covered, carefully find the edges and pick up the corners in a manner that doesn't loose any chips. Hang the tarp from the scale and read the weight.
- H. If the actual spread rate is more than 3 pounds different than desired, on the display push the right arrow to access the Calibration page. Press the #1 button to highlight the pan weight. Use the up/down arrows to enter the weight correction. Ex. If the tarp weight (pan weight) was 4lbs heavy then enter -4 to correct and press OK. Ex. If the tarp weight was 10 lbs light then enter 10 to correct and press OK.
- I. Run the calibration procedure again to check. It is not uncommon to make a few adjustments before you get it right.
- J. The Right spread hopper is controlled with the hopper balance. The hopper balance allows you to increase or decrease the rate on the right side for a total of + or - 10%. It is best you make this adjustment visually while chipping. The balance display works in



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increments of .01%, so it means you have to increase 10 to equal 1% difference. As you are spreading and the right side appears light, increase by 10 press OK and wait for the result. Sometimes 1% change is difficult to see a result so don't be afraid to change by 20. If the right side seems heavy then decrease to negative numbers. Always press OK after making a change. Remember, always make your rate decisions based on the performance of the left side, then make your right side match.





OPERATING INSTRUCTIONS

Operating the chipper can involve more than just driving and following a meet line. There are many operational and logistical practices that make a good operator

Dump Trucks

Dump truck crews can range from 1 to 50 based on the distance to the material and the rate of production. Some jobs are stock piled every few miles while other jobs may require trucking from hundreds of miles away. Not much happens without dump trucks and it is a good practice to set up good communication as well as common procedure while operating. Good jobs can go on for days with little conversation because everyone knows their job and where to be at the right time. If you find yourself yelling and screaming at drivers multiple times a day, the problems you face may very well be your own.

- a. Be consistent.
After considerable practice, you will find that a lot of the different areas like a cul-de-sac, radius, tapers or just open road you chip can be done with similar movements. If everybody gets used to these practices they know where to be and what to do.
- b. Be polite.
Spending a minute with a new driver explaining what's expected can save you an infinite amount of time in the future. Drivers tend to communicate with other drivers while in-route to the aggregate source. If you are nice and helpful you may acquire more help.
- c. Work towards the stock pile or aggregate source.
Loaded trucks turning around on your fresh chip seal can be disastrous, not to mention it's hard on the trucks. If you are chipping towards the aggregate source the trucks are already pointed the right direction when they show up.
- d. Dump trucks make good rollers.
Instruct the dump trucks following the chipper in reverse to stagger their paths from each other to help with rolling. One dump truck in the chipper and two following in reverse with the rollers behind them is generally a good practice. If there

are more dumps trucks waiting, its best to stagger them ahead spaced approximately the distance they cover.

e. Hooking.

It is faster for the chipper to back to the dump truck than sitting and waiting for them to back into you. While you back up to the dump truck, press and hold the Hitch “open” for 2 seconds. Ease backwards with the dump truck holding its brakes until you feel contact. While continuing to hold pressure against the dump truck, press the Hitch “closed” switch for 2 seconds. With the chipper in “forward” give the dump truck a gentle tug to insure connection. This should be a cue to the dump truck to release his brakes and his tail gate. The dump truck should also have engaged the PTO prior to this.

There are three basic rules for dump trucks.

1. Apply the brakes while hooking, but never again until released unless instructed.
2. Never release your tailgate unless instructed or pulled.
3. Look out both mirrors and stay centered in the hopper.
4. Help watch for power lines or wires.

f. Pulling.

Be gentle while pulling or stopping. It can be hard on equipment and people if you are rough. This can irritate drivers and equipment owners if you tear things up.

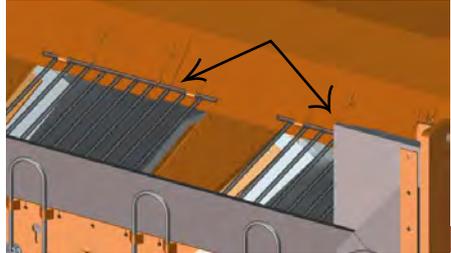
g. Keep the dump truck centered.

There is a common misconception that the dump truck will follow the chipper, and all the driver need do is let go of the steering wheel or hold it straight. This could not be farther from the truth. If the dump truck is not centered in the hopper, it will push against one side or the other and cause the chipper to jack-knife. There is not much you can do about keeping the trucks centered in the hopper except instruct the drivers to watch out both mirrors. Watch where they look, if they only look out there left mirror, they are most likely pushing against your left side. The same is true when the chipper backs up with the dump truck attached. Keep the chipper hopper centered on the dump bed.



h. Filling the Hopper

In most cases keeping the rear hopper as full as possible lets you pay attention to more important things. The only potential problem in rare cases is heavy material may overload the belts and cause them to stop or track poorly. This can be fixed by adjusting the strike off plates. Watch the tailgate of the dump truck does not press against the hopper as this can break the tailgate as well as sometimes it may take weight off the drivers of the dump truck causing them to drag and scar up the chip seal.



i. Releasing trucks.

When the dump truck is empty it is a good practice to stop the chipper with the front hopper full. When the dump bed is empty and the conveyors remove enough aggregate from the rear hopper to unhook without spilling then lower the bed and stop. In reverse give the dump truck a gentle push backward while holding the hitch “open”. Do not release the truck with the bed fully up as this will destroy the hopper flashing in short order. Empty trucks can spin their tires very easily on the fresh unrolled chips. This will give the dump truck a rolling start and cue the dump truck that it is empty. The rolling start enables them to drop it in gear and go without spinning. The push off signals them to pull out of the way and you can roll right back into the next truck. If you stop with the front hopper full you can start chipping as soon as you hook up. If you empty the front hopper before stopping you will have to wait for the hopper to fill every time you hook up.

j. Judging material.

You may be approaching the end of the job or the street. It can be a messy ordeal to have a full chipper and be connected to a full dump truck and try to disconnect. Think ahead, if you see the end coming or the distributor blow empty, tip the bed down so you can empty the rear hopper. If the distributor is empty and there is a long wait, it is important to get off the chips so the rollers can do their job.

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Wires, wires, wires.

Wires can be deadly. Always keep a look out for wires. Take a good look at the road ahead of you before you tip the bed up. The entire crew should keep a look out for wires. Some of the best dump truck drivers watch and lower and raise their bed automatically.

Conveyor Belts & Augers

Belts carry the material from the rear hopper to the left and right front hoppers. The belts are controlled by an ultra-sonic sensor at the front that maintains the aggregate level with belt speed as well as starting and stopping. The augers pull material from under the belts to the end of the hopper and are controlled on and off by a diaphragm switch. On the Console each belt has a control switch labeled Auto, MSTR and Off. Auto will keep the front hoppers full at all times. Some times while waiting for dump trucks you may turn off the belts because they are continuously running empty. This can set you up to run out of aggregate and drive into the oil by forgetting to turn them back on when a dump truck shows up and you hook up and go. By turning them to MSTR has the same function as AUTO except when you turn the Master Off at the end of the chip seal the belts and augers stop until you turn the Master back on at the start of the next run.

To the right of the belt and auger controls is a manual control for belts and augers. The manual switch will operate at anytime and override Auto and MSTR controls. By leaving the belts on MSTR and using the manual override you can move material out of the rear hopper to unhook a dump truck without changing the settings of your belt and auger controls. Remember that when you are manually moving material you may be over filling the front hopper.

On long runs you should develop a sense of timing of the belts turning on and off intermittently. Pay attention to the level of material on the belts. This can be done at a quick glance or by sound and peripheral vision. Empty belts have a different sound than loaded belts and can tell you to raise the dump bed or you are empty without looking back.

Visibility and Mirrors

Comfort and visibility are paramount while operating the chipper. Position yourself to see the edge you are following, opposite side through the rear mirror, rear hopper, and the aggregate level in the front hopper through the front mirrors. Keep your mirrors clean and adjusted. If you cant see what you are doing, then you don't know what you are



doing. You should develop a habitual scan that starts with:

- Looking for wires.
- Check the height of the dump bed.
- Check rear hopper level.
- Are the belts full and running intermittently.
- Front hopper mirrors for material level.
- Outside mirror for chip seal coverage.
- Back to the meet line.

Staring down at the edge or meet line can be hard on your neck and forces bigger head movements during your scan. Learn to look out over the front of the chipper at your line with a downward look now then to check your accuracy. Looking forward improves your ability to drive straight. Sitting forward leaning over the steering wheel causes you have to make big body movements to preform your scan. This can make it hard to drive straight. Sit back in your seat with both feet forward, get comfortable and you will drive a straighter line.

Visibility can also include seeing the spray bar of the asphalt distributor. Changes in width if visible can give you a heads up. Spotting plugged nozzles can save a lot of patchwork. If you can see the spray bar and spray pattern you are generally far enough back to not get covered in asphalt over spray at the end of the day.

Application Rate

The Computer monitors the ground speed and controls the gate opening to deliver the right application rate. In the preparation section we calibrated the chipper prior to chipping. This set the display number to read the actual output of the chipper. Most jobs have a target design application rate and some fine tuning may be required after the initial calibration. In the initial calibration we calibrated to within about 3 pounds of the desired rate and left it at that. Calibrating with a tarp on the side of the road is a crude and moderately accurate process that gets you close so you can fine tune later.

- a. Visual adjustment.
The first run may require some adjustment to make the rate

visually appear right. Don't try to calibrate at this point. Use the Inc/Dec switch to adjust the rate until you are satisfied with the mat. If the chipper has been sitting a while there may be rust on the inside of the hopper. This can resist the flow of aggregate causing you to increase your actual rate to compensate. The layer of rust generally is gone or smooth after a few dump trucks have been emptied.

b. Fine tune the calibration.

After every thing is warmed up, smoothed off and you have stopped changing the rate, you can leave the rate setting where it is and continue, or calibrate. If you continue without calibrating and the actual rate is more than 20% different than the display, you may notice a change in actual rate at different speeds. To calibrate, on the display push the right arrow to access the Settings Menu. Press the **1** button to enter the Settings Page. Press the **1** button again to highlight the PSY/Correction. Use the up/down arrows to enter the weight correction. Ex. If the actual weight (pan weight) was 4lbs heavy then enter -4 to correct and press OK. Ex. If the tarp weight was 10 lbs light then enter 10 to correct and press OK. This will change your actual rate to whats displayed so now change the displayed weight the same amount you corrected the PSY/Correction. Sounds Confusing.

For example, you visually adjusted the rate and were happy with the mat at what was displayed as 30#.

The actual rate turns out to be 25#.

You calibrate and enter a -5# in the PSY/Correction.

Your display still says 30# so thats what the actual rate will be.

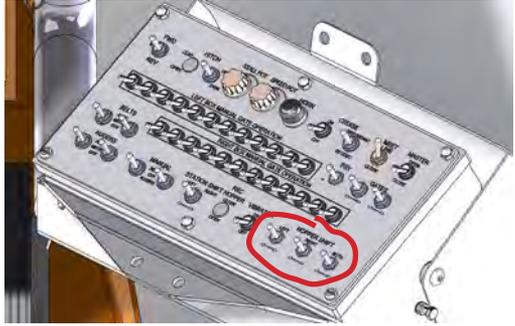
Now adjust your display rate to 25# and it will put the rate back to where you liked it and the displayed rate and the application rate will be the same.

Width Control

The two spread hoppers move hydraulically to compensate for spread width. The two hoppers share a common strike-off plate that prevents the hoppers from overlapping the spread in the center of the machine. With all the gates selected "open" or "on" you can move the hoppers in or out to compensate for width. Generally you can setup for a known width on a highway job and make little changes throughout the day. Then there are jobs that may require constant width adjustment.



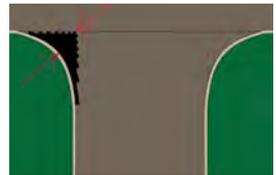
Mirror adjustment is crucial to maintain good visibility. With all the gates selected on, use the “Both” switch on the Console to make these changes. By moving the hoppers equally, it keeps the machine balanced. You can use the “Left” or “Right” Hopper Shift for special occasions, but this can cause the machine weight to be un-balanced and possibly tip to the heavy side. The other down side to being un-balanced or focusing the spread to one side is, only one belt is feeding the spread. This will result in the rear fill hopper being empty of aggregate on one side and too full to un-hook the dump truck on the other side.



Another method of width control is selecting the individual gates. Sometimes it is convenient to set the hoppers a foot or two wider and select these extra feet off to allow for changes. Generally if a distributor changes width, it will be in a 1 foot increment. By leaving an extra foot outside of the spread turned off, you can select it on when needed by simply selecting the taper switch versus hydraulically moving the hopper which requires more attention. Normal asphalt distributors can be referenced for width by keeping an eye on the spray bar. The center section is 8 feet, the wings can vary based on manufactured options. Each foot of spray bar has 3 nozzles. It is a good practice to be able to identify the spread width of the asphalt distributor.

Radius

Shooting a radius or a taper is not limited to the exceptionally gifted. It is a function of timing, counting and practice, and it can be calculated. Pay attention to a good distributor operator



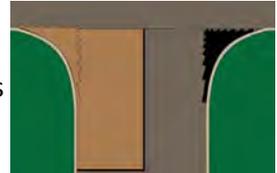
when they shoot a radius. Count the number of feet at the widest point or peak. The radius in the picture is 7 feet wide by observing the Distributor. Next the distributor will trim the radius and cover half of the street about 75’ long. At this length, a loaded chipper should cover the approach and radius without refilling. In this example we are not chipping the cross street.





The chipper should cover the half street next leaving a meet line for the next half. Now, remembering the widest part of the radius was 7 feet, back up to the start of the radius. Using the right Taper switch, turn off all the gates from right to left. Turn the master switch on. Drive

towards the radius with the edge of the hopper following the curb. Use the right Taper Switch to turn back on the first gate when you see the edge of the oil appear. Keep moving at a steady speed following the curb with the edge of the hopper. As the radius becomes to wide for the first gate, turn on the second and so on, developing a rhythm as you lose sight of the mat under the chipper. Because you counted every gate as you turned them on, you know where the peak of the radius is under the chipper. The Distributor shot 7 feet wide so you will cover it with 8 feet. As you near the peak your rhythm should increase slightly. This part is where practice will improve.

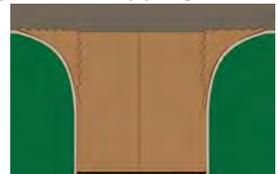


The eighth foot is on very briefly before you start turning the gates back off with the Taper Switch. As you increased your rhythm towards the peak in the beginning, begin to slow the rhythm from the peak to the end. Having the hoppers spread out gives you more visibility shooting the radius. The count is the most important part.



Operators tend to get sloppy when they just flick

gates on off rapidly leaving a messy radius. While you are chipping the first radius, the distributor should start on the second. While the distributor is shooting, you should get another fill of chips. The Distributor will trim and shoot the second half. Move the Operator Station to the right and cover the second half with the same procedure. It is important to break up

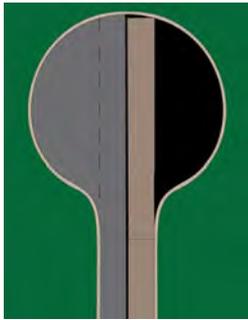


intersections in half so the oil is covered and rolled in time. By leaving an accurate meet line in the center you will develop trust with the asphalt distributor operator and they will be more incline to shoot intersections in halves and not try to cover the entire intersection prior to chipping. Covering entire intersections can take much time and cause the oil to set prior to chipping.



Cul-De-Sacs

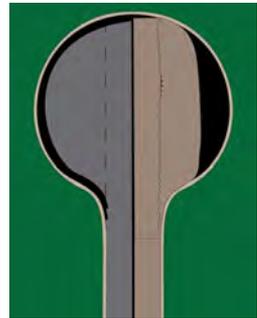
Cul-de-sacs can be done in much the same way as a radius. After the distributor has shot half of the cul-de-sac, chip your approach path just like the radius, leaving a meet line in the center.



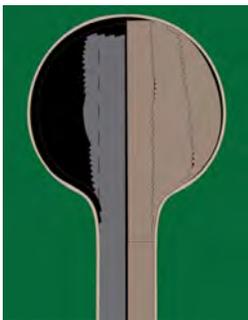
Depending on the size of the cul-de-sac, you can generally get two passes with a full chipper. The approach pass can usually be done hooked to the dump truck. This leaves you with a full machine for the next two passes. When you chipped the approach pass you were driving on the left leaving a nice meet line for the second half. When you backed up and disconnected the dump truck you moved the operator station to the right. Just like a radius, follow the curb (tapered off from left to right and Master on) and start tapering gates back on as you round the curve.



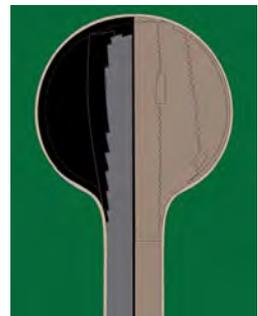
There is a tendency at this point to follow the curb all the way around the cul-de-sac but this will drag your rear tire through the oil making a mess. Instead, as you round the curve tapering gates on, keep your peripheral vision intermittently focused on your opposite rear mirror. As you round the corner you will see the meet line come



out the other side in your mirror. At this point follow the meet line in your mirror overlapping the previous chip slightly. This sounds complicated but it is the same moves over and over again so you should learn what to expect. As you approach the curve towards the end, be prepared to turn in and follow the curve again. As you start the turn in taper the gate switches back off.

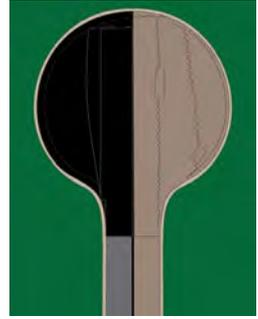


By watching the opposite mirror you will see when to start the taper and develop the speed rhythm. When you finish, you are tapered off and ready for the next pass. If the cul-de-sac is not too big you should have enough for another pass. Back up and do it again. Most likely it is time for a fill from the dump truck. You will



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over time learn to judge how far you can spread with a full chipper. Make your last pass or two as well trim any parts you missed. Keep an eye on the distributor as most cul-de-sac have enough room for the distributor to start on the second half when you have chipped halfway through the first. A good distributor / chipper team is always moving. On the second half keep your eye on the rollers, they need their time and are just as important and part of the team. A well practiced crew can finish a cul-de-sac every 15-20 minutes.



Hydrostatic Drive

Transfer Case

Normal operation should be conducted in high range whenever possible. This helps protect the hydrostatic drive motor from over-speeding when chipping down hill. Use low range when excessive weight or inclines do not permit the use of high range.

High and Low range in the transfer case is switched by an air cylinder controlled by a switch on the dash. Just like a truck transmission, if there is a load on the transfer case it might be difficult to shift. First shift to neutral. Then use FWD or REV and throttle to move the machine back and forth until neutral is achieved.

Low Lock

The full range of operation (high range) from 0 to 1675 FPM is controlled by the range of displacement of the hydrostatic pump and motor. To start from 0 FPM the pump is at minimal displacement and the motor is at max displacement. As the pump increases displacement controlled by the throttle pedal which in turn controls the EDC (Electronic Displacement Control), the machine starts to move. As the pump displacement continues to increase, the speed increases. At about half of the max speed the pump has reached full displacement. At this point the motor starts to decrease its displacement. As the motor's displacement continues to decrease, the speed will increase. Think of the chain and sprockets of a ten speed bicycle. The front sprockets are the pump, the rear sprockets the motor.

Low Lock turns off the displacement control of the motor. This holds the motor in full displacement resulting in the max speed of 1100 FPM. This



also gives the operator smoother control. With Low Lock turned off, the first half of the throttle pedal controls the pump and the second half controls the motor. With Low Lock on, the full range of the throttle pedal controls the pump resulting in better resolution or smoother control.

Stall Pot

The Stall Pot controls at what RPM the machine starts to move. The Stall Pot at minimum (counter clockwise) will allow the machine to move forward with the throttle pedal at around 1050 RPM. At max Stall Pot the machine will not move until around 1650 RPM. In normal chipping operation there are a lot of requirements of the hydraulic systems which require 1500+ engine RPM. To allow the machine to move slowly at a higher RPM so all hydraulic functions have full power (belts require a lot of hydraulic power), turn the Stall Pot up. For maneuvering or roading while not chipping it is more pleasant to operate with the Stall Pot at minimum. You can find a Stall Pot position that suits you based on the level of chipping production required. Remember that sluggish or slow hydraulic functions may be a result of low engine RPM.

Automotive Control

The Computer controls all functions of the chip spreader based on operator input. The Automotive Control is a term for the way the Computer manages engine torque based on operational demands. If all hydraulic and drive functions were instantly actuated, it would stall the engine. The Computer manages hydraulic controls by ramping or easing controls on or off to maintain peak engine torque. These processes happen in milliseconds and most or all go un-noticed by the operator. For example, if you were chipping up a steep hill and both belts turned on at the same time, this can require 50 horse power and could stall the engine. The Computer ramps the belts on and slightly decreases the speed all while maintaining peak torque and engine RPM. The only noticeable change to the operator is the machine may travel slower under extreme loads. The Automotive Control also has some safety features designed to protect the hydrostatic. The computer ramps the acceleration and deceleration as well as the transition from forward to reverse. The Computer also limits the max speed in different ranges to prevent the over speeding of the drive motor. The only noticeable control change from the computer would be on a down grade close to full speed, you may feel the hydrostatic decelerate periodically.

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Optional 4 x 4

The optional rear drive axle provides additional traction for pulling heavy loads up steep grades. Like the Transfer Case, the shifter to engage or disengage the rear axle is operated by an air cylinder. The air cylinder operates a driveline disconnect. The splines on the disconnect have to line up to engage. On the Dash, switch on 4 x 4 and move the machine slowly in FWD or REV until you hear a clunk or its indicated on the dash. It is possible for the splines to stay misaligned even while moving back and forth. In this case, move forward in a tight turn to force the two drive axles to move at slightly different speeds to change the alignment of the splines.



Rules of Thumb

Temperature

If your wearing a jacket, its too cold.

If the forecast is for 70°, that means it could possibly reach that temperature if only for 5 minutes. Most chip seal designs require 2-4 hours of cure time at temperature.

Pay attention to over night forecast. Night time temperatures dropping below 40° can cause failures with emulsions.

Use the ambient (outside air) temperature as a reference. Infrared temperature guns are pretty good for diagnosing hydraulic problems and paving, As for chip seal they make pretty good wheel chocks.

Spread Rate

Good chip seal final design starts with boots on the mat.

Look for complete single layer coverage of the aggregate. Next determine that the aggregate is immersed in the asphalt about 50%.

Different road conditions may require a change in oil spread rate. Old raveled pavement may cause the oil to fill tiny voids and reduce the coverage on the aggregate. Likewise tight pavement may cause your chip seal to bleed, so reduce the oil, not increase the aggregate. Aggregate coverage should never vary much in this decision process. New asphalt and fresh patches can suck up the oil like a sponge. It is a good practice to fog seal these areas prior to chipping. High temperatures in the afternoon can cause bleeding with a design that was perfect in the morning. If you cant reduce the asphalt spread rate, back the chipper off a couple hundred feet.

Rolling

There are a lot of fancy rolling specs. Getting the first pass within about 3 minutes is most important. If you are sitting on fresh chip waiting for dump trucks, Move!

BOLT TORQUE CHART

Torque specs in Foot Pounds with threads lubricated.



SIZE	GRADE 2	GRADE 5	GRADE 8	L9
1/4-20	5	7	9	11
1/4-28	6	9	10	13
5/16-18	8	13	18	21
5/16-24	9	14	20	23
3/8-16	15	23	30	33
3/8-24	17	25	35	38
7/16-14	24	35	55	60
7/16-20	25	40	60	65
1/2-13	35	55	80	95
1/2-20	40	65	90	105
9/16-12	50	80	110	140
9/16-18	55	90	130	150
5/8-11	70	110	170	185
5/8-18	80	130	180	205
3/4-10	120	200	280	290
3/4-16	140	220	320	355
7/8-9	140	300	460	505
7/8-14	155	320	500	585
1-8	160	440	680	775
1-14	170	480	740	900
1 1/8-7	220	600	960	1150
1 1/8-12	260	660	1080	1325
1 1/4-7	320	840	1360	1600
1 1/4-12	360	920	1500	1750
1 3/8-6	420	1100	1780	2345
1 3/8-12	460	1260	2040	2660
1 1/2-6	560	1460	2360	3250
1 1/2-12	620	1640	2660	3650



FPM ↔ mph	1 FPM = .0114 mph	1 mph = 88 FPM	F°	C°
Miles ↔ Kilometers	1 Mile (5280') = 1.609 km	1 km (1000m) = .62 Miles	20	-6.7
			30	-1.1
Miles ↔ Meters	1 Mile = 1609.3 m	1 km = 8500.8 ft	40	4.4
			50	10.0
Feet ↔ Meters	1 ft = .3048 m	1 m = 3.281 ft	60	15.6
			70	21.1
Feet ² ↔ Meters ²	1 ft ² = .093 m ²	1 m ² = 10.76 ft ²	80	26.7
			90	32.2
Yard ↔ Meters	1 yd = .914 m	1 m = 1.093 yd	100	37.8
			110	43.3
Yard ² ↔ Meters ²	1 yd ² = .836 m ²	1 m ² = 1.196 yd ²	120	48.9
			130	54.4
Yard ³ ↔ Meters ³	1 yd ³ = .756 m ³	1 m ³ = 1.308 yd ³	140	60.0
			150	65.6
Pounds ↔ Kilograms	1 lb = .45 kg	1 kg = 2.2 lb	160	71.1
			170	76.7
PSY ↔ KSM	1 PSY = .54 KSM	1 KSM = 1.8 PSY	180	82.2
			190	87.8
Tons ↔ Tones (metric)	1 ton = .907 tones	1 tone = 1.102 tons	200	93.3
			210	98.9
Gallons ↔ Liters	1 gal = 3.785 l	1 l = .264 gal	220	104.4
			230	110.0
GSY ↔ LSM	1 GSY = 3.16 LSM	1 LSM = .316 GSY	240	115.6
			250	121.1
Emulsion @ 140° F (approximately)	1 ton (240 gal) = 908.4 liter	1 tone (264 gal) = 1001 liters	260	126.7
			270	132.2
Asphalt @ 325° F (approximately)	1 Ton (245 gal) = 927.4 liter	1 tone (270 gal) = 1022 liters	280	137.8
			290	143.3
GPM ↔ LPM	1 gal/min = 3.785 liter/min	1 liter/min = .264 gal/min	300	148.9
			310	154.4
PSI ↔ Bar	1 psi = .069 bar	1 bar = 14.504 psi	320	160.0
			330	165.6
Horse Power ↔ Kilowatt	1 hp = .746 kw	1 kw = 1.34 hp	340	171.1
			350	176.7
BTU/hr ↔ Kilowatt/hr	1 btu/hr = .0002931 kw/hr	1 kw/hr = 3412.2 btu/hr	360	182.2
			370	187.8
Fahrenheit ↔ Celsius	F° → C° (F°-32)/1.8	C° → F° (C° x 1.8)+32	380	193.3
			390	198.9
			400	204.4
			410	210.0
			420	215.6
			430	221.1
			440	226.7
			450	232.2
			460	232.8

Using the table above, multiply the (known quantity) x (conversion).

ex. (FPM ↔ mph) 1 FPM = .0114 mph. If you are traveling at 500 FPM, multiply (500 x .0114) to convert to mph (5.7mph).

Calculate Area

All spreadrate calculations are in square yards or yd²
 Measure in Feet (Length x Width) ÷ 9 = yd²

Check Spread Rate

GSY

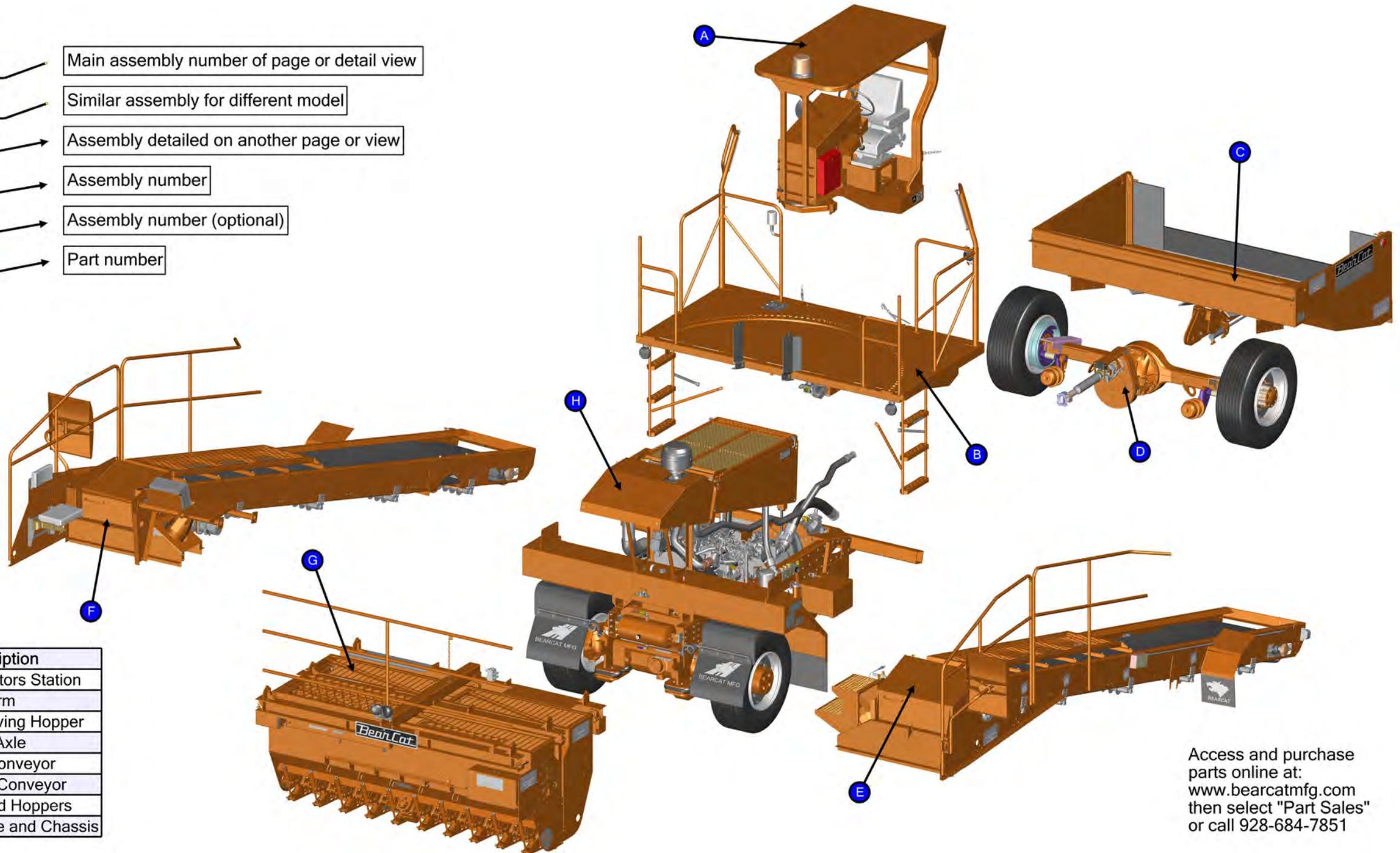
(Gallons used) ÷ yd² = GSY

PSY

(Tons used x 2000) ÷ yd² = PSY



- Label → Main assembly number of page or detail view
- Label → Similar assembly for different model
- Id → Assembly detailed on another page or view
- Id → Assembly number
- Id → Assembly number (optional)
- Id → Part number



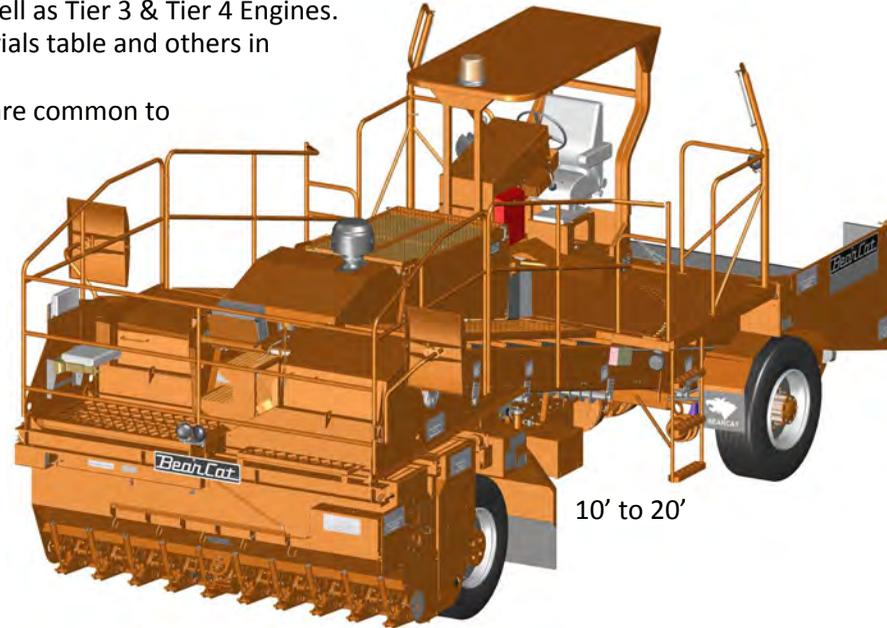
ID	Description
A	Operators Station
B	Platform
C	Receiving Hopper
D	Rear Axle
E	Left Conveyor
F	Right Conveyor
G	Spread Hoppers
H	Engine and Chassis

Access and purchase parts online at:
www.bearcatmfg.com
 then select "Part Sales"
 or call 928-684-7851

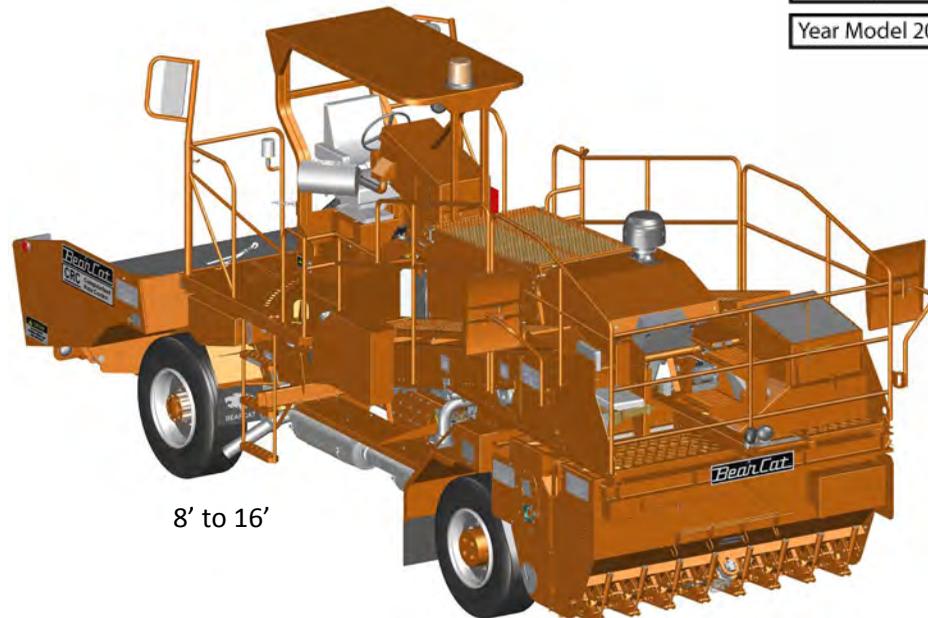
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Parts Manual covers the 8' to 16' and 10' to 20' as well as Tier 3 & Tier 4 Engines. Some details show the difference in the Bill of Materials table and others in separate detail views.

Views or Tables that make no reference to 8' or 10' are common to both machines as well as Tier 3 and Tier 4.



8' refers to 8' to 16' Tandem Chipper.
 10' refers to 10' to 20' Tandem Chipper.
 x2 refers to 2 wheel drive.
 x4 refers to 4 wheel drive.
 T3 refers to Tier 3 Cummins Engine
 T4 refers to Tier 4 Cummins Engine
 (Uses DEF fluid).



CT16-10X4-T4

CT "Chipper Tandem"

Year Model 2016

Chasis Width
 8 = 8' to 16'
 10 = 10' to 20'

Axle Drive
 2 = Front wheel drive only
 4 = All wheel drive

Engine Emissions
 T3 = Tier 3 Engine
 T4 = Tier 4 Engine

8' to 16'

Main Assembly Numbers

ID	DESCRIPTION	CT16-8X2-T3	CT16-8X2-T4	CT16-8X4-T3	CT16-8X4-T4
A	Operators Station	211737	211737	211737	211737
B	Platform	211703	211703	211703	211703
C	Receiving Hopper	212919	212919	212919	212919
D	Rear Axle	210337	210337	210684	210684
E	Left Conveyor	212918	212918	213387	213387
F	Right Conveyor	212917	212917	213388	213388
G	Spread Hoppers	212914	212914	212914	212914
H	Engine and Chassis	214591	214592	214591	214592

10' to 20'

Main Assembly Numbers

ID	DESCRIPTION	CT16-10X2-T3	CT16-10X2-T4	CT16-10X4-T3	CT16-10X4-T4
A	Operators Station	211737	211737	211737	211737
B	Platform	211699	211699	211699	211699
C	Receiving Hopper	211690	211690	211690	211690
D	Rear Axle	210323	210323	210687	210687
E	Left Conveyor	211697	211697	213385	213385
F	Right Conveyor	211698	211698	213386	213386
G	Spread Hoppers	211696	211696	211696	211696
H	Engine and Chassis	214380	214547	214380	214547

Parts Contents

62 A OPERATORS STATION

- 62 211737 Control Station
- 63 A1 212004 Console
- 63 A2 212007 Display Panel
- 63 A3 210336 Junction Panel
- 63 A4 OPT-60643 C.B. Option

64 B PLATFORM

- 64 211699 10' Platform
- 64 211703 8' Platform
- 65 B1 209651 Hydraulic Tank

65 C RECIEVING HOPPER

- 65 211690 Standard 10' Recieving Hopper
- 66 C1 MCH-53216 Hitch Assembly
- 66 210700 10' Folding
- 66 212919 8' Folding
- 66 211660

67 D REAR AXLE

- 67 210684 4x4 Rear Axle 8'
- 67 210687 4x4 Rear Axle 10'
- 67 210337 4x2 Rear Axle 8'
- 67 210323 4x2 Rear Axle 10'

68 E LEFT CONVEYOR ASSEMBLY

- 68 213385 Left 10' 4x4
- 68 211697 Left 10' 4x2
- 68 213387 Left 8' 4x4
- 68 212918 Left 8' 4x2
- 69 E Left Conveyor Assembly Cont.

70 F RIGHT CONVEYOR ASSEMBLY

- 70 213386 Right 10' 4x4
- 70 211698 Right 10' 4x2

- 70 213388 Right 8' 4x4
- 70 212917 Right 8' 4x2
- 70 F1 210157 Slave Box
- 71 F 213386 Right Conveyor Assembly Cont.

72 G SPREAD HOPPER ASSEMBLY

- 72 211696 10' Spread Hopper Assembly
- 72 212914 8' Spread Hopper Assembly
- 73 G1 & G2 Right & Left Hoppers
- 73 212008 Right 10'
- 73 212009 Left 10'
- 73 212915 Left 8'
- 73 212916 Right 8'
- 74 G1 & G2 Auger & Gate Detail
- 75 G3 211996 Valve Box
- 75 G4 VLV-35008 Valve Bank
- 76 G5 205689 Cam Gearbox
- 76 214591 8' T3
- 76 214592 8' T4
- 76 214380 10' T3
- 76 214547 10' T4

76 H CHASSIS AND DRIVE ASSEMBLY

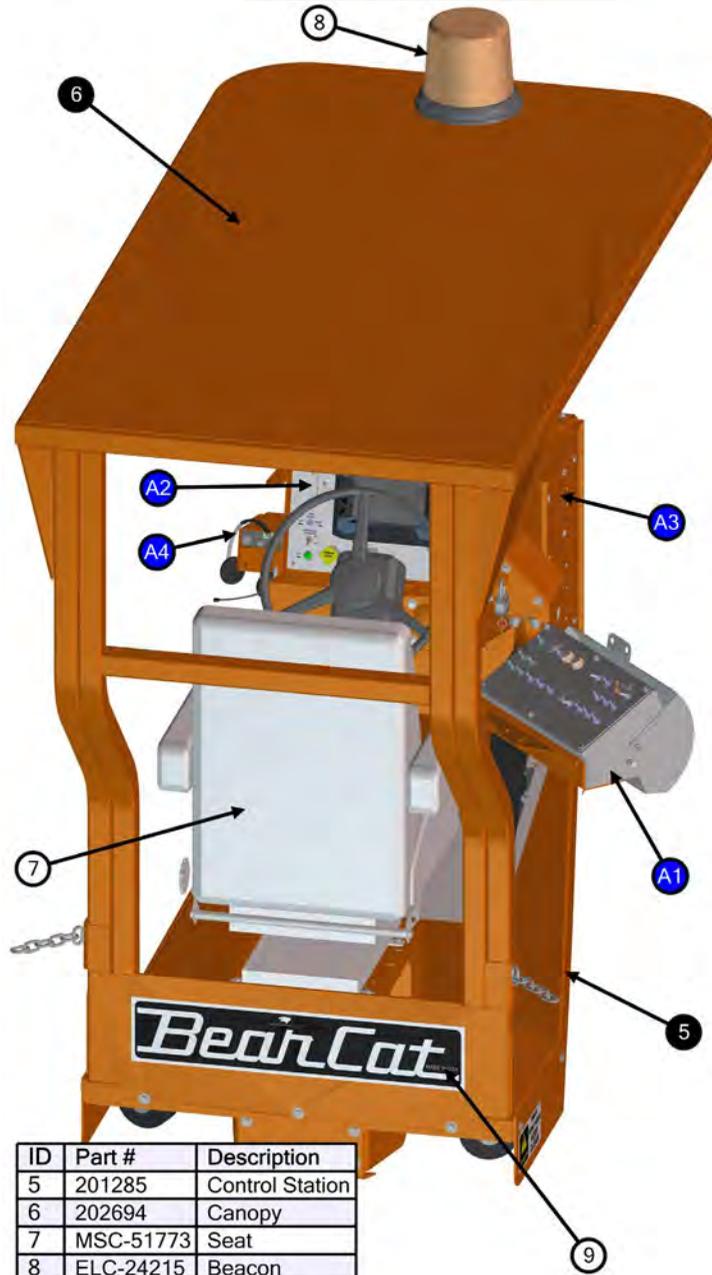
- 78 H1 211982 Hydrostatic Dive & Hydrualic Pump Stack
- 78 H2 211932 Diesel Tank & Load Sense Hydraulics
- 78 H3 Radiator
- 78 214379 T3
- 78 214546 T4
- 79 H4 211702 Transfer Case & Drive Motor
- 79 H5 204289 Front Axle Wishbone
- 80 H6 211691 Hyd Valves
- 80 H7 214426 Hyd Valves
- 80 H8 213273 Chassis Frame
- 81 H9 214377 Left Hyd. Return Manifold
- 81 H10 211977 Right Hyd. Return Manifold
- 81 H12 HSG-51473 Stantion Air Tank
- 81 H11 TNK-51993 Front Air Tank
- 82 H13 214549 Tier 4 Engine, Exhaust & Hydraulic Stack
- 83 H14 213177 Tier 4 Engine
- 84 H15 213358 Tier 4 Exhaust
- 84 H16 214444 Tier 3 Engine, Exhaust & Hydraulic Stack
- 85 H17 201662 Tier 3 Engine

86 SCHEMATICS & DRAWINGS

- 86 Hydraulics 210211 1 of 2
- 87 Hydraulics 210211 2 of 2
- 88 Junction Box 210313
- 89 LH Valve Box 210180
- 90 RH Valve Box 210181
- 91 Operator Control Box 202541
- 92 Slave Box 210149
- 93 Pneumatics 200007
- 94 Dash Panel 202540
- 95 Node Functions and Locations

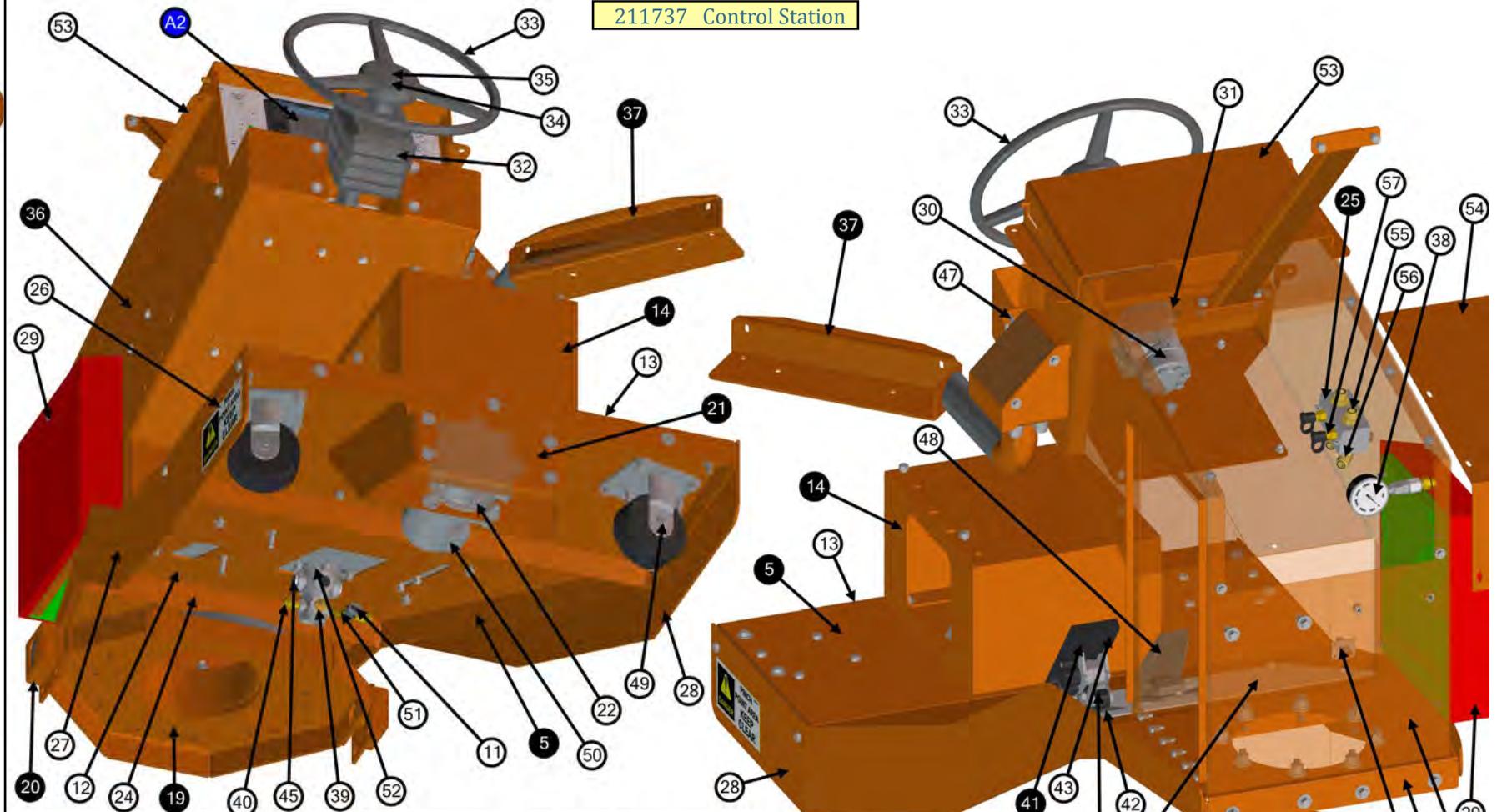


A OPERATORS STATION



ID	Part #	Description
5	201285	Control Station
6	202694	Canopy
7	MSC-51773	Seat
8	ELC-24215	Beacon
9	DCL-51890	Decal
A1	212004	Console
A2	212007	Display Panel
A3	210336	Junction Panel
A4	OPT-60643	C.B. Option

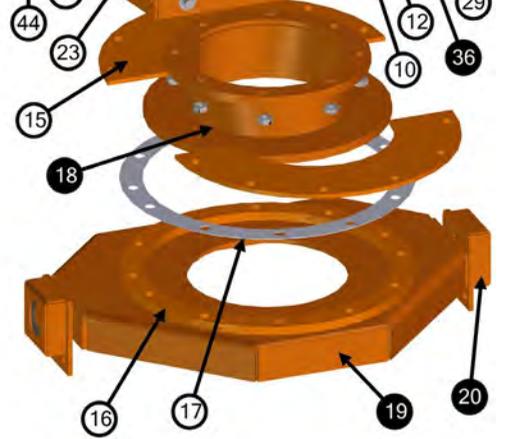
211737 Control Station

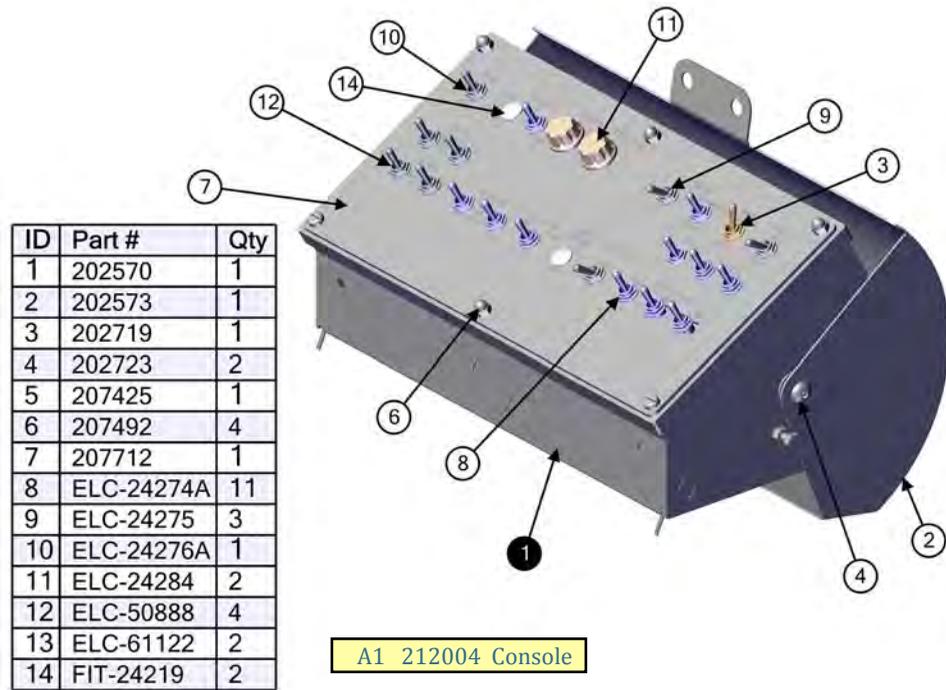


ID	Part #	Qty
5	201285	1
6	202694	1
7	MSC-51773	1
8	ELC-24215	1
9	DCL-51890	1
10	200656	1
11	200757	1
12	201287	1
13	201289	1
14	201291	1
15	202378	1
16	202379	1
17	202381	1
18	202385	1
19	202417	1
20	202422	2
21	202425	1
22	202430	1
23	202493	1
24	202553	1
25	202919	1
26	202949	1
27	203985	1
28	203987	1
29	204919	1
30	205267	1
31	206648	1
32	210084	1

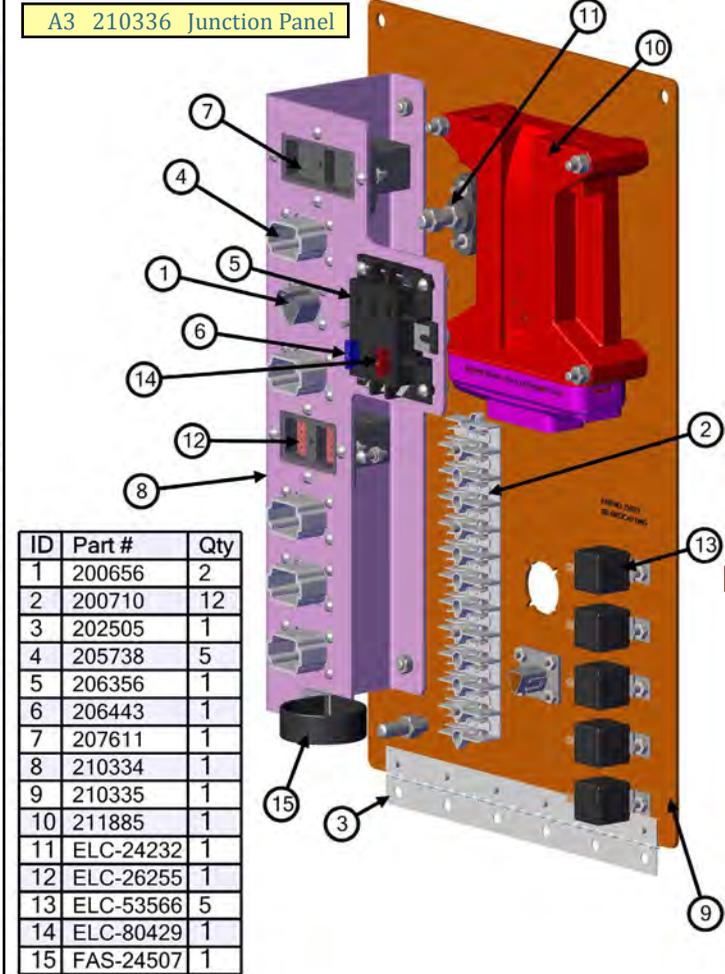
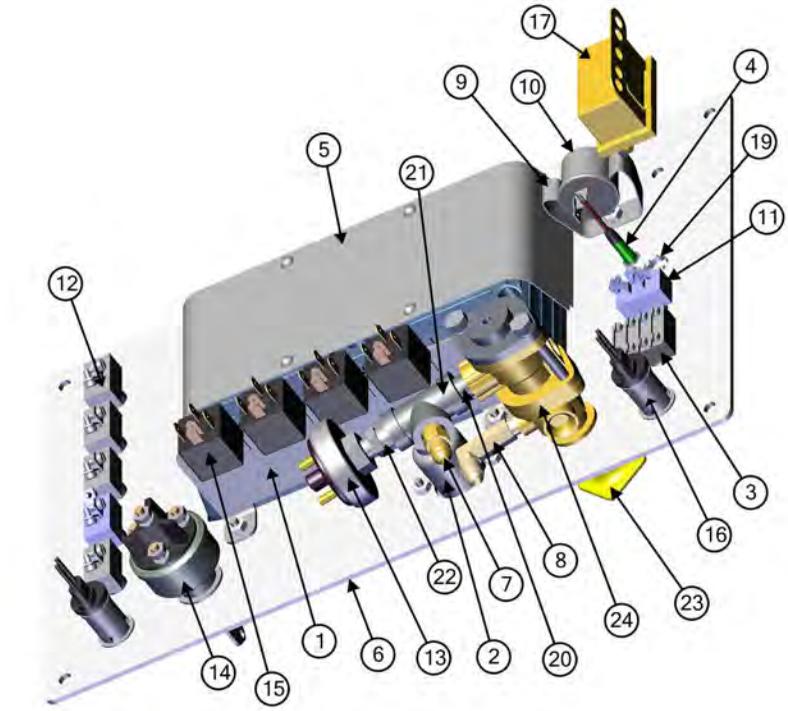
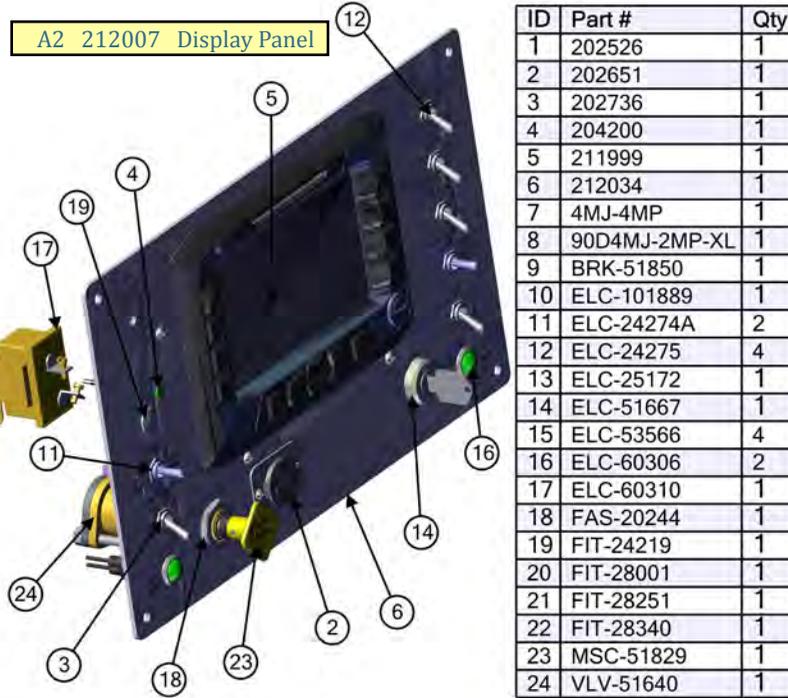
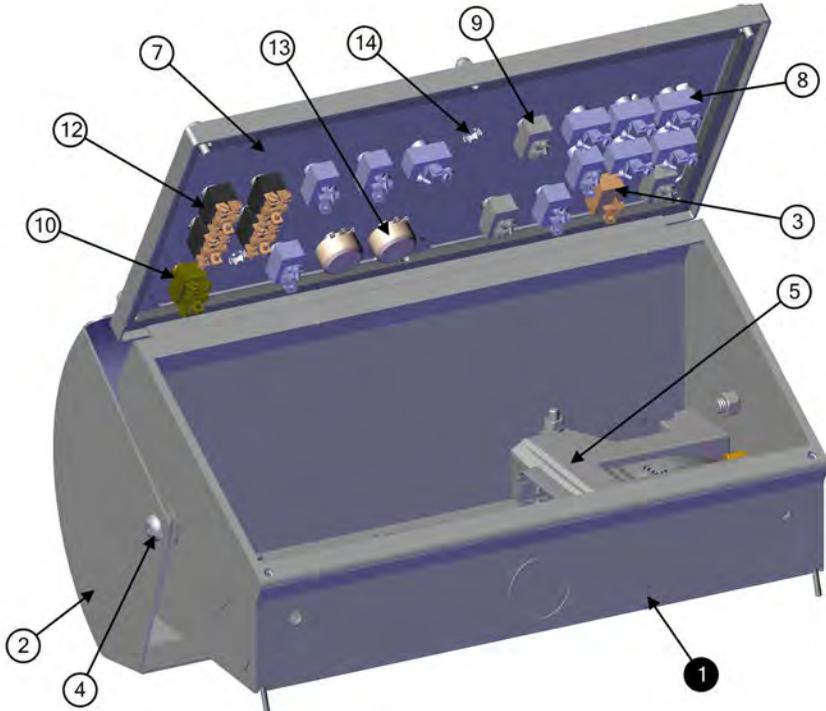
ID	Part #	Qty
19	202417	1
20	202422	2
21	202425	1
22	202430	1
23	202493	1
24	202553	1
25	202919	1
26	202949	1
27	203985	1
28	203987	1
29	204919	1
30	205267	1
31	206648	1
32	210084	1
33	210085	1
34	210086 (Nut)	1
35	210087	1
36	210124	1
37	210125	1
38	210216	1
39	8MJ-8MP	1
40	90d4MJ-4MP	2
41	ELC-51837	1
42	ELC-51837-1	1
43	ELC-51837-2	1
44	ELC-51837-3	1
45	FIT-28298	5
47	MSC-51249	1
48	MSC-51639	1
49	MSC-81304	2
50	PMP-53664	1
51	T4FP-4FP-4MP	1
52	VLV-51639	1
53	209682	1
54	202088	1
55	8MB-8MF	2
56	8MB-8MF90	2
57	FIT-53637	2
A2	212007	1

ID	Part #	Qty
48	MSC-51639	1
49	MSC-81304	2
50	PMP-53664	1
51	T4FP-4FP-4MP	1
52	VLV-51639	1
53	209682	1
54	202088	1
55	8MB-8MF	2
56	8MB-8MF90	2
57	FIT-53637	2
A2	212007	1

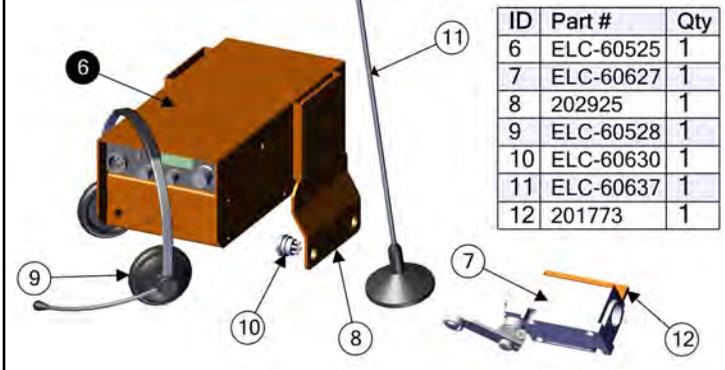




A1 212004 Console



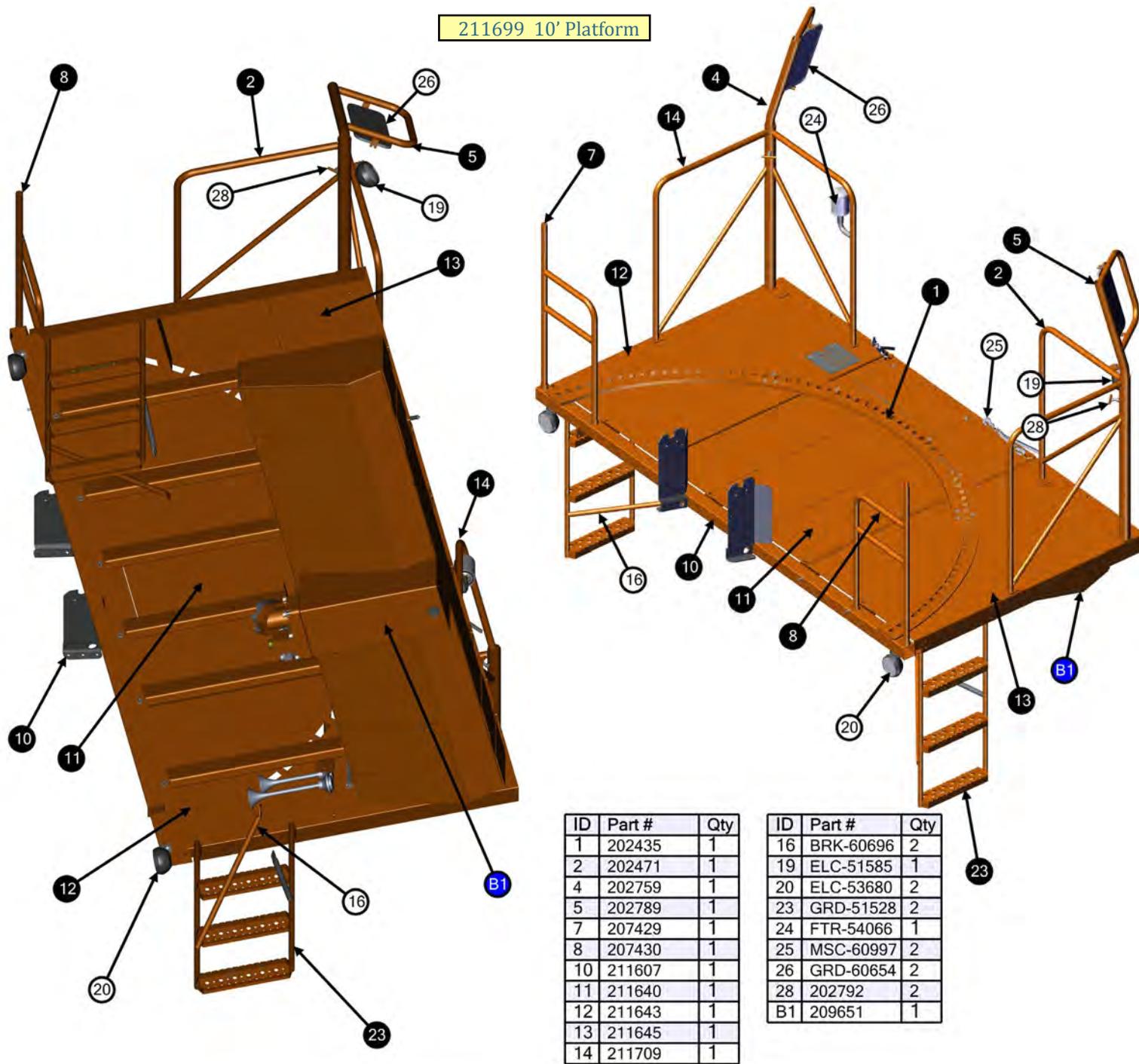
A3 210336 Junction Panel



A4 OPT-60643 C.B. Option

Parts

211699 10' Platform

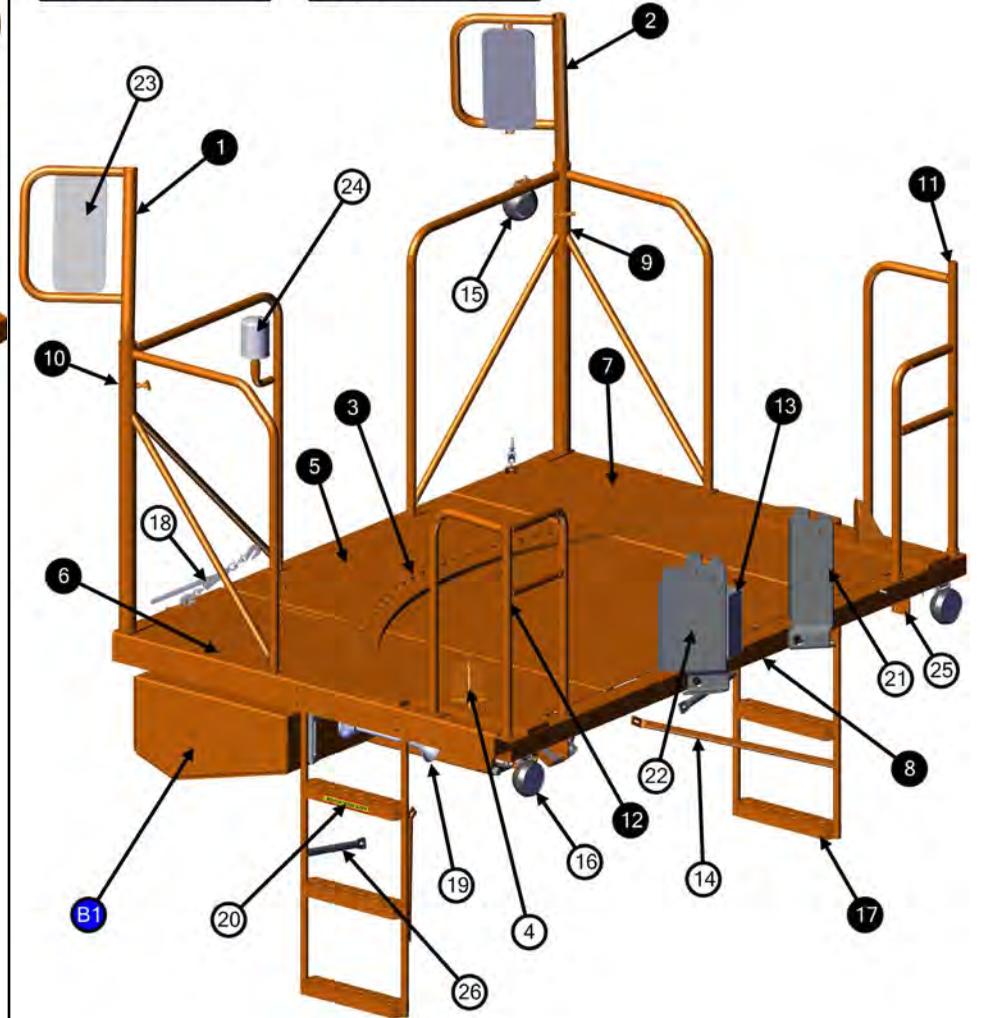


ID	Part #	Qty
1	202435	1
2	202471	1
4	202759	1
5	202789	1
7	207429	1
8	207430	1
10	211607	1
11	211640	1
12	211643	1
13	211645	1
14	211709	1

ID	Part #	Qty
16	BRK-60696	2
19	ELC-51585	1
20	ELC-53680	2
23	GRD-51528	2
24	FTR-54066	1
25	MSC-60997	2
26	GRD-60654	2
28	202792	2
B1	209651	1

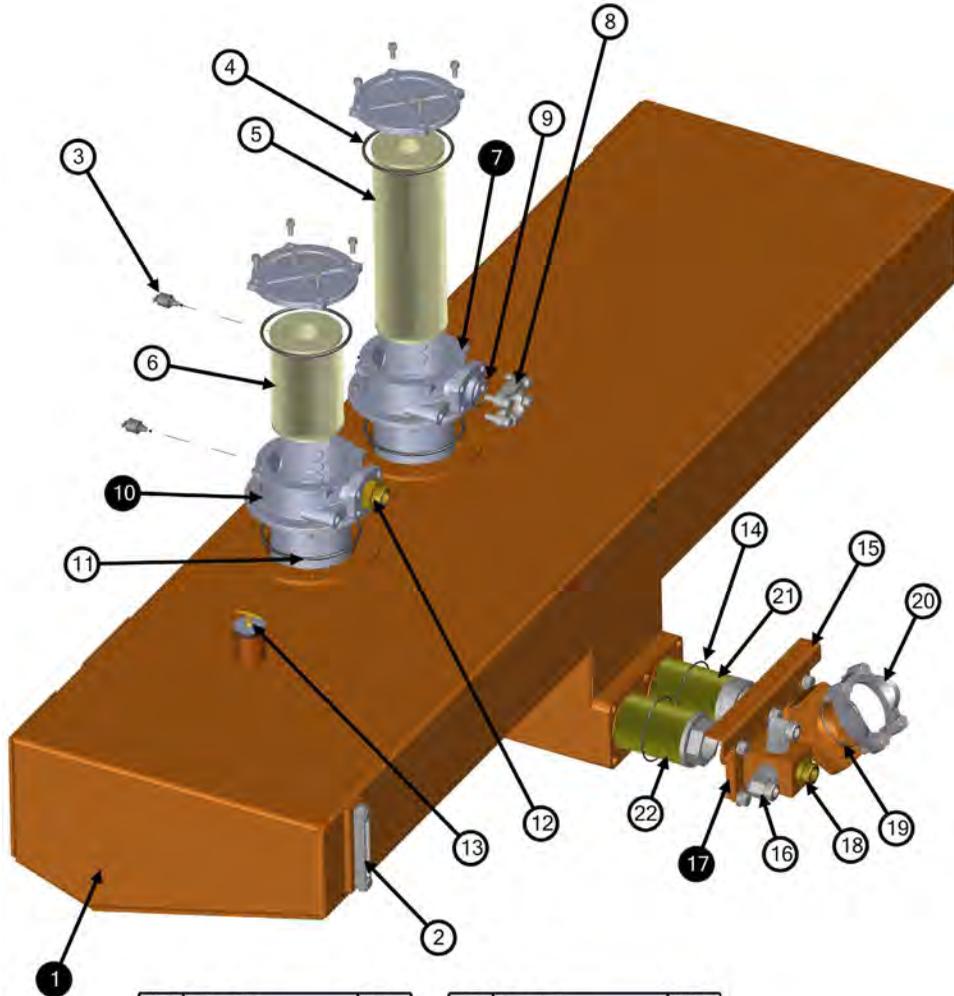
211703 8' Platform

ID	Part #	Qty	ID	Part #	Qty	ID	Part #	Qty
1	202759	1	11	210160	1	21	207926	1
2	202789	1	12	210171	1	22	207927	1
3	208125	1	13	212909	1	23	GRD-60654	2
4	208570	2	14	BRK-60696	2	24	FTR-54066	1
5	210099	1	15	ELC-51585	1	25	BRK-61565	1
6	210102	1	16	ELC-53680	2	26	BRK-60667	2
7	210103	1	17	GRD-51528	2	B1	209651	1
8	210107	1	18	MSC-60997	2			
9	210150	1	19	MSC-51645	1			
10	210151	1	20	DCL-51729	2			



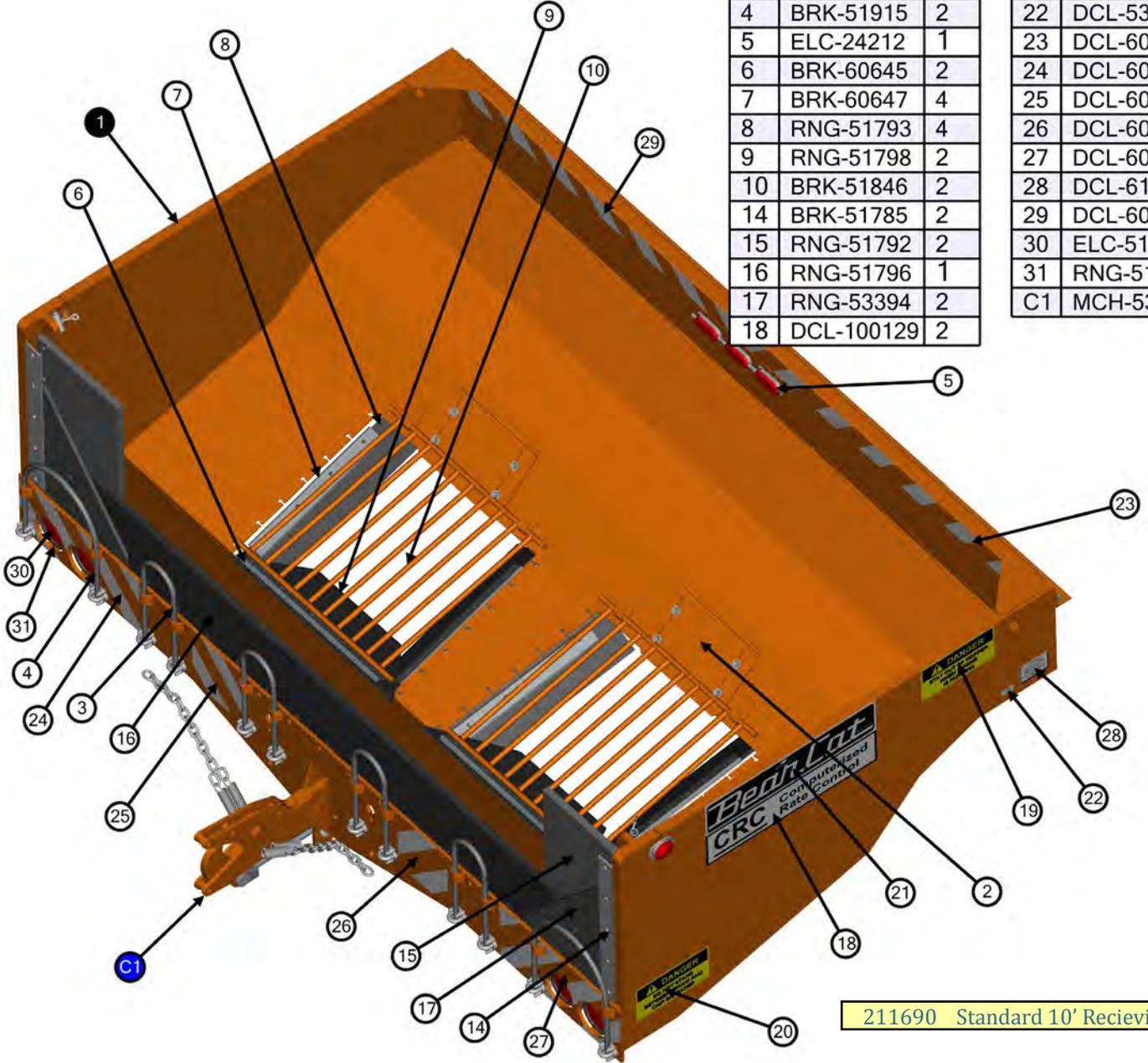
C RECIEVING HOPPER

B1 209651 Hydraulic Tank



ID	Part #	Qty
1	209645	1
2	210437	1
3	213197	2
4	213882	2
5	210047	1
6	210048	1
7	213198	1
8	210862	1
9	212834	1
10	213199	1
11	213883	2
12	24MB-20MF	1

ID	Part #	Qty
13	FIT-26035	1
14	211653	2
15	212795	1
16	90D16MB-16MF	2
17	211647	1
18	20MB-20MF	1
19	213884	1
20	210859	1
21	211649	1
22	211650	1

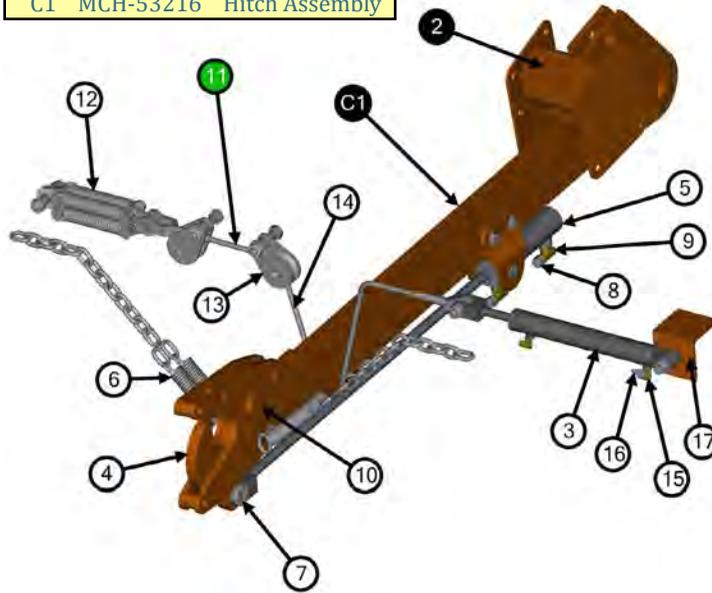


ID	Part #	Qty
1	211693	1
2	201068	2
3	BRK-51914	4
4	BRK-51915	2
5	ELC-24212	1
6	BRK-60645	2
7	BRK-60647	4
8	RNG-51793	4
9	RNG-51798	2
10	BRK-51846	2
14	BRK-51785	2
15	RNG-51792	2
16	RNG-51796	1
17	RNG-53394	2
18	DCL-100129	2

ID	Part #	Qty
19	DCL-51701	2
20	DCL-51702	2
21	DCL-51890	2
22	DCL-53709	2
23	DCL-60752	1
24	DCL-60753	1
25	DCL-60754	1
26	DCL-60755	1
27	DCL-60756	1
28	DCL-61026	2
29	DCL-60751	1
30	ELC-51588	4
31	RNG-51590	4
C1	MCH-53216	1

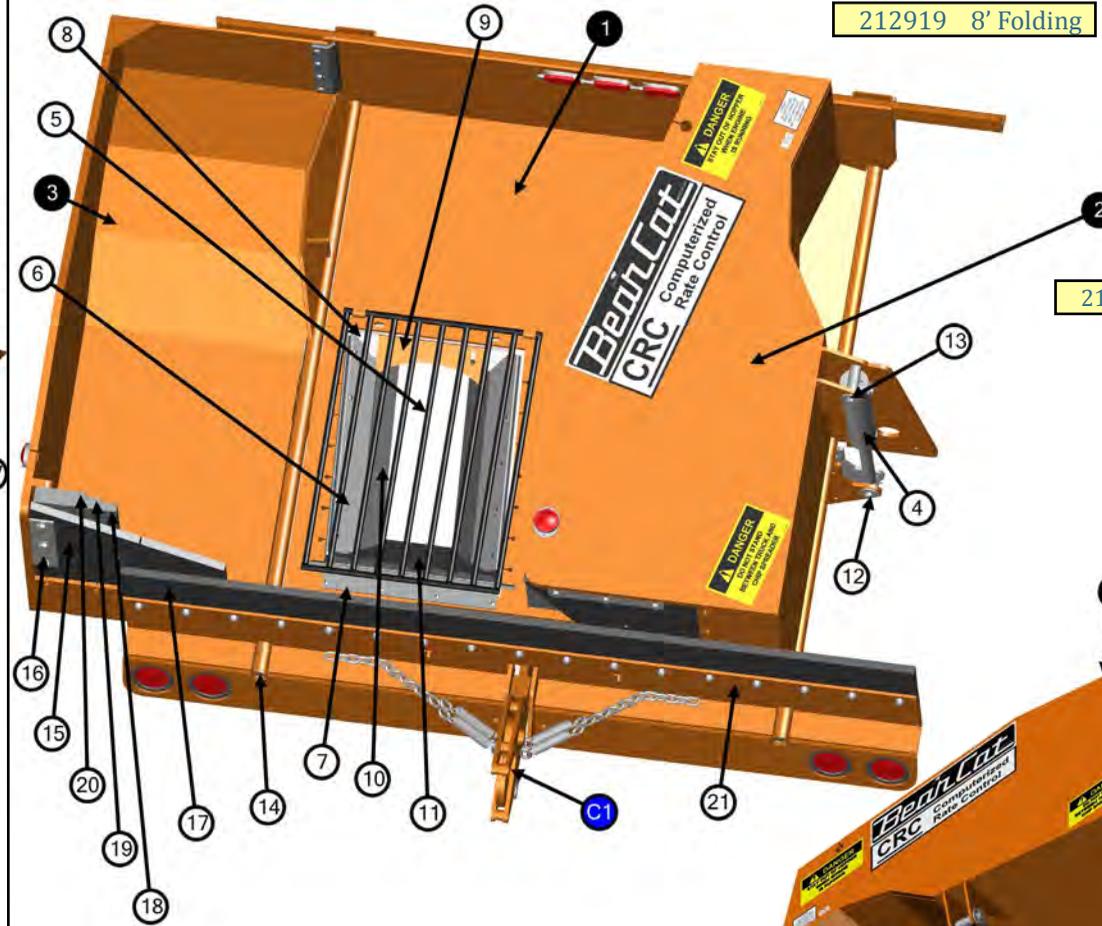
211690 Standard 10' Recieving Hopper

C1 MCH-53216 Hitch Assembly



ID	Part #	Qty
2	HSG-53229	1
3	CYL-22300	1
4	BRK-61501	1
5	CYL-60651	1
6	MCH-51814	2
7	FAS-60941	1
8	C8FJ	2
9	T8MF-8MB-8MF	2
10	201110	1

ID	Part #	Qty
11	204137	1
12	MCH-51816	1
13	200173	2
14	PTM-61616	1
15	4MB-4MF90	2
16	FIT-29980	1
17	BRK-61613	1
C1	MCH-53216 *	1

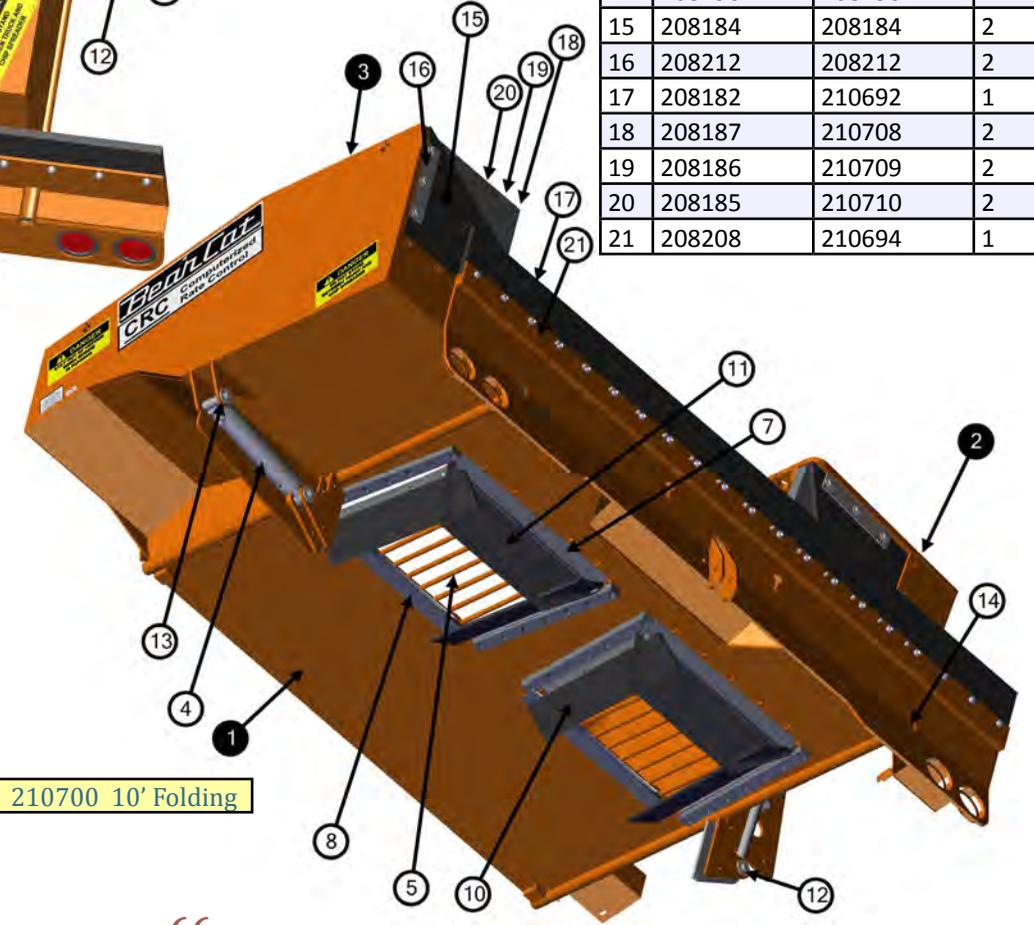


212919 8' Folding

211660

ID	8' Part#	10' Part#	Qty
1	211661	210699	1
2	211668	210678	1
3	211669	210679	1
4	207866	207866	1
5	211676	BRK-51846	2
6	211674	208330	4
7	208603	210701	2
8	208611	210704	2
9	208612	210705	2
10	211673	RNG-51793	4
11	208213	210702	2
12	207871	207871	2
13	207873	207873	2
14	208190	208190	2
15	208184	208184	2
16	208212	208212	2
17	208182	210692	1
18	208187	210708	2
19	208186	210709	2
20	208185	210710	2
21	208208	210694	1

210700 10' Folding

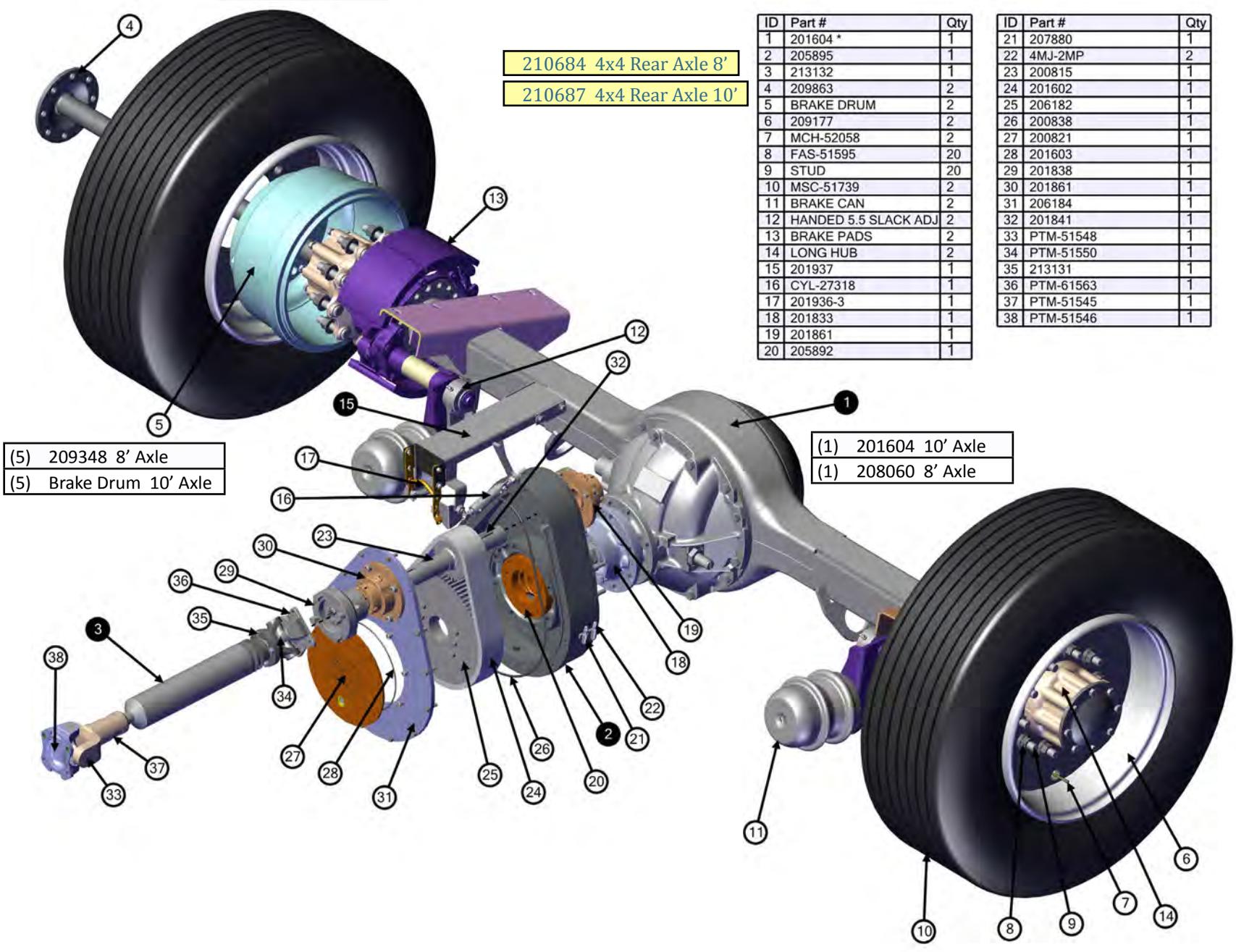


D REAR AXLE

210684 4x4 Rear Axle 8'
 210687 4x4 Rear Axle 10'

ID	Part #	Qty
1	201604 *	1
2	205895	1
3	213132	1
4	209863	2
5	BRAKE DRUM	2
6	209177	2
7	MCH-52058	2
8	FAS-51595	20
9	STUD	20
10	MSC-51739	2
11	BRAKE CAN	2
12	HANDED 5.5 SLACK ADJ	2
13	BRAKE PADS	2
14	LONG HUB	2
15	201937	1
16	CYL-27318	1
17	201936-3	1
18	201833	1
19	201861	1
20	205892	1

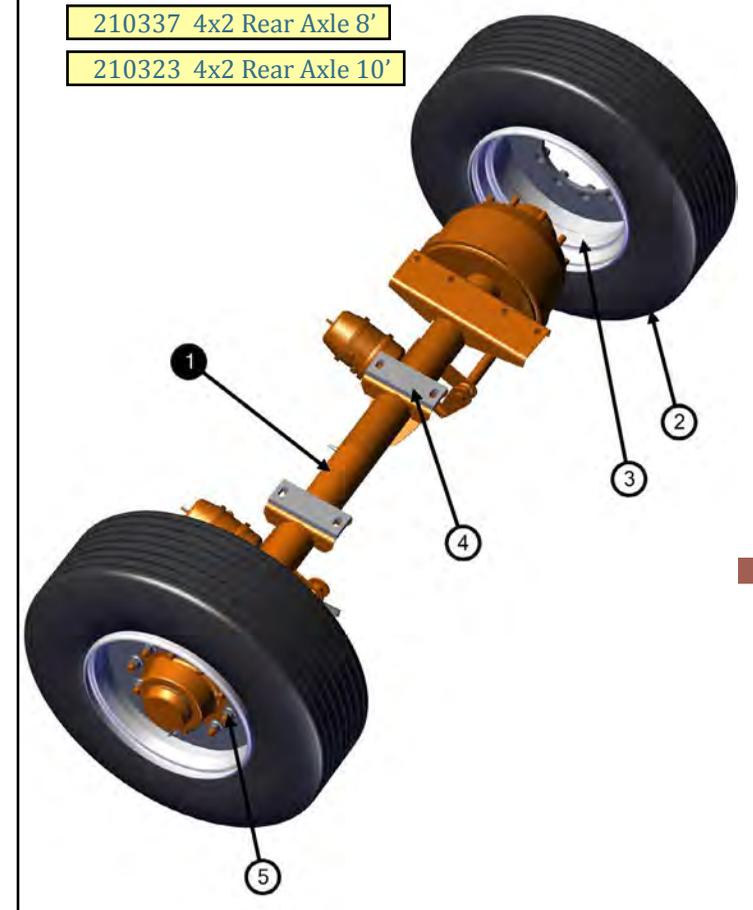
ID	Part #	Qty
21	207880	1
22	4MJ-2MP	2
23	200815	1
24	201602	1
25	206182	1
26	200838	1
27	200821	1
28	201603	1
29	201838	1
30	201861	1
31	206184	1
32	201841	1
33	PTM-51548	1
34	PTM-51550	1
35	213131	1
36	PTM-61563	1
37	PTM-51545	1
38	PTM-51546	1



(5) 209348 8' Axle
 (5) Brake Drum 10' Axle

(1) 201604 10' Axle
 (1) 208060 8' Axle

210337 4x2 Rear Axle 8'
 210323 4x2 Rear Axle 10'

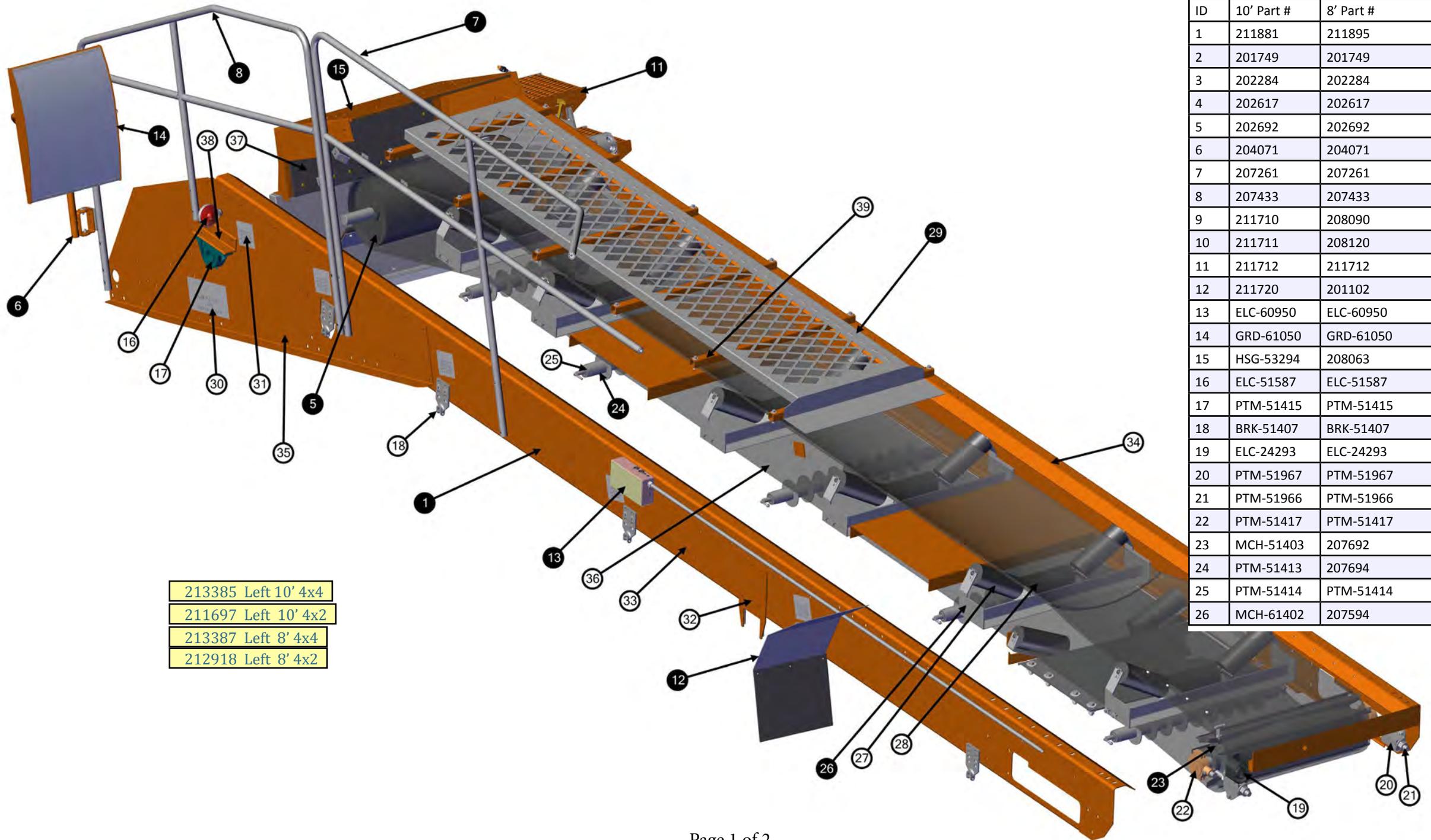


ID	Part #	Qty
1	208085	1
2	MSC-51739	2
3	MSC-61466	2
4	207882	2
5	FAS-51595	20

(1) 208085 8' Axle
 (1) PTM-53348 10' Axle

Parts

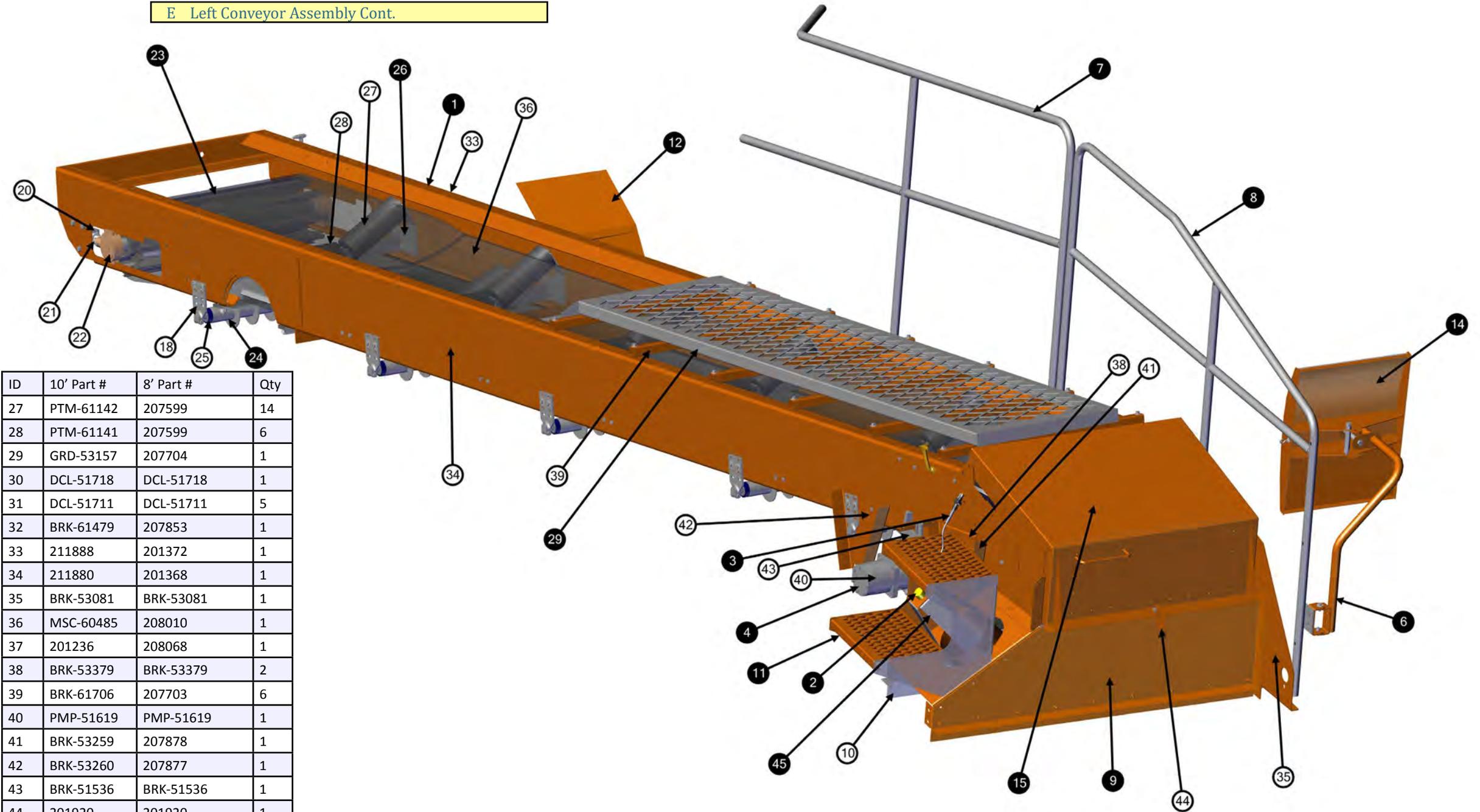
E LEFT CONVEYOR ASSEMBLY



- 213385 Left 10' 4x4
- 211697 Left 10' 4x2
- 213387 Left 8' 4x4
- 212918 Left 8' 4x2

ID	10' Part #	8' Part #	Qty
1	211881	211895	1
2	201749	201749	1
3	202284	202284	1
4	202617	202617	1
5	202692	202692	1
6	204071	204071	1
7	207261	207261	1
8	207433	207433	1
9	211710	208090	1
10	211711	208120	1
11	211712	211712	1
12	211720	201102	1
13	ELC-60950	ELC-60950	1
14	GRD-61050	GRD-61050	1
15	HSG-53294	208063	1
16	ELC-51587	ELC-51587	1
17	PTM-51415	PTM-51415	2
18	BRK-51407	BRK-51407	10
19	ELC-24293	ELC-24293	1
20	PTM-51967	PTM-51967	2
21	PTM-51966	PTM-51966	2
22	PTM-51417	PTM-51417	2
23	MCH-51403	207692	1
24	PTM-51413	207694	5
25	PTM-51414	PTM-51414	10
26	MCH-61402	207594	6

E Left Conveyor Assembly Cont.

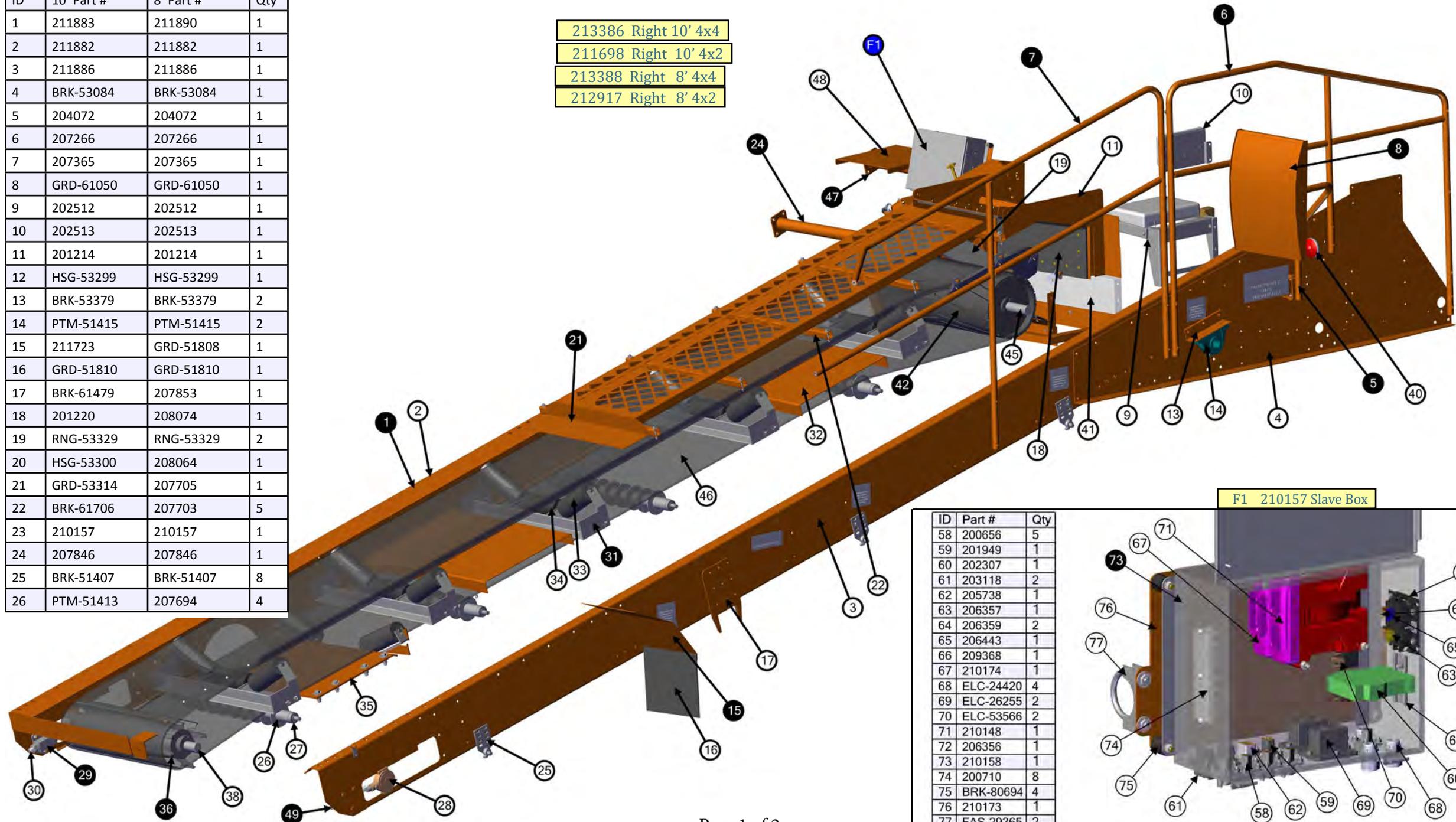


ID	10' Part #	8' Part #	Qty
27	PTM-61142	207599	14
28	PTM-61141	207599	6
29	GRD-53157	207704	1
30	DCL-51718	DCL-51718	1
31	DCL-51711	DCL-51711	5
32	BRK-61479	207853	1
33	211888	201372	1
34	211880	201368	1
35	BRK-53081	BRK-53081	1
36	MSC-60485	208010	1
37	201236	208068	1
38	BRK-53379	BRK-53379	2
39	BRK-61706	207703	6
40	PMP-51619	PMP-51619	1
41	BRK-53259	207878	1
42	BRK-53260	207877	1
43	BRK-51536	BRK-51536	1
44	201920	201920	1
45	202508	202508	1

F RIGHT CONVEYOR ASSEMBLY

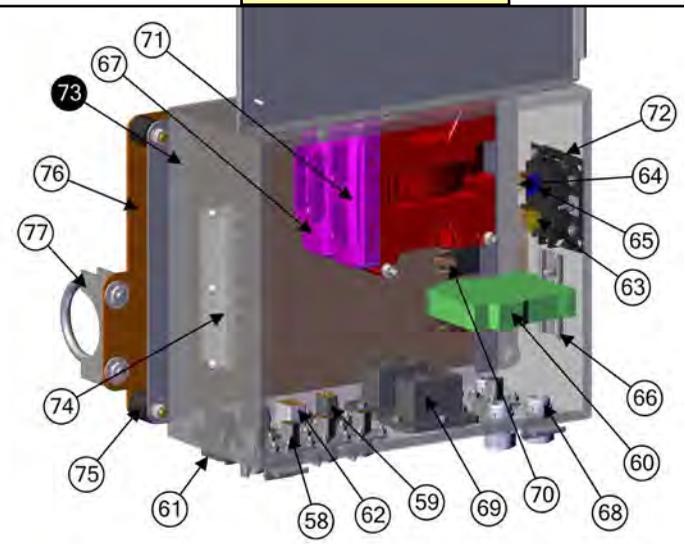
ID	10' Part #	8' Part #	Qty
1	211883	211890	1
2	211882	211882	1
3	211886	211886	1
4	BRK-53084	BRK-53084	1
5	204072	204072	1
6	207266	207266	1
7	207365	207365	1
8	GRD-61050	GRD-61050	1
9	202512	202512	1
10	202513	202513	1
11	201214	201214	1
12	HSG-53299	HSG-53299	1
13	BRK-53379	BRK-53379	2
14	PTM-51415	PTM-51415	2
15	211723	GRD-51808	1
16	GRD-51810	GRD-51810	1
17	BRK-61479	207853	1
18	201220	208074	1
19	RNG-53329	RNG-53329	2
20	HSG-53300	208064	1
21	GRD-53314	207705	1
22	BRK-61706	207703	5
23	210157	210157	1
24	207846	207846	1
25	BRK-51407	BRK-51407	8
26	PTM-51413	207694	4

- 213386 Right 10' 4x4
- 211698 Right 10' 4x2
- 213388 Right 8' 4x4
- 212917 Right 8' 4x2

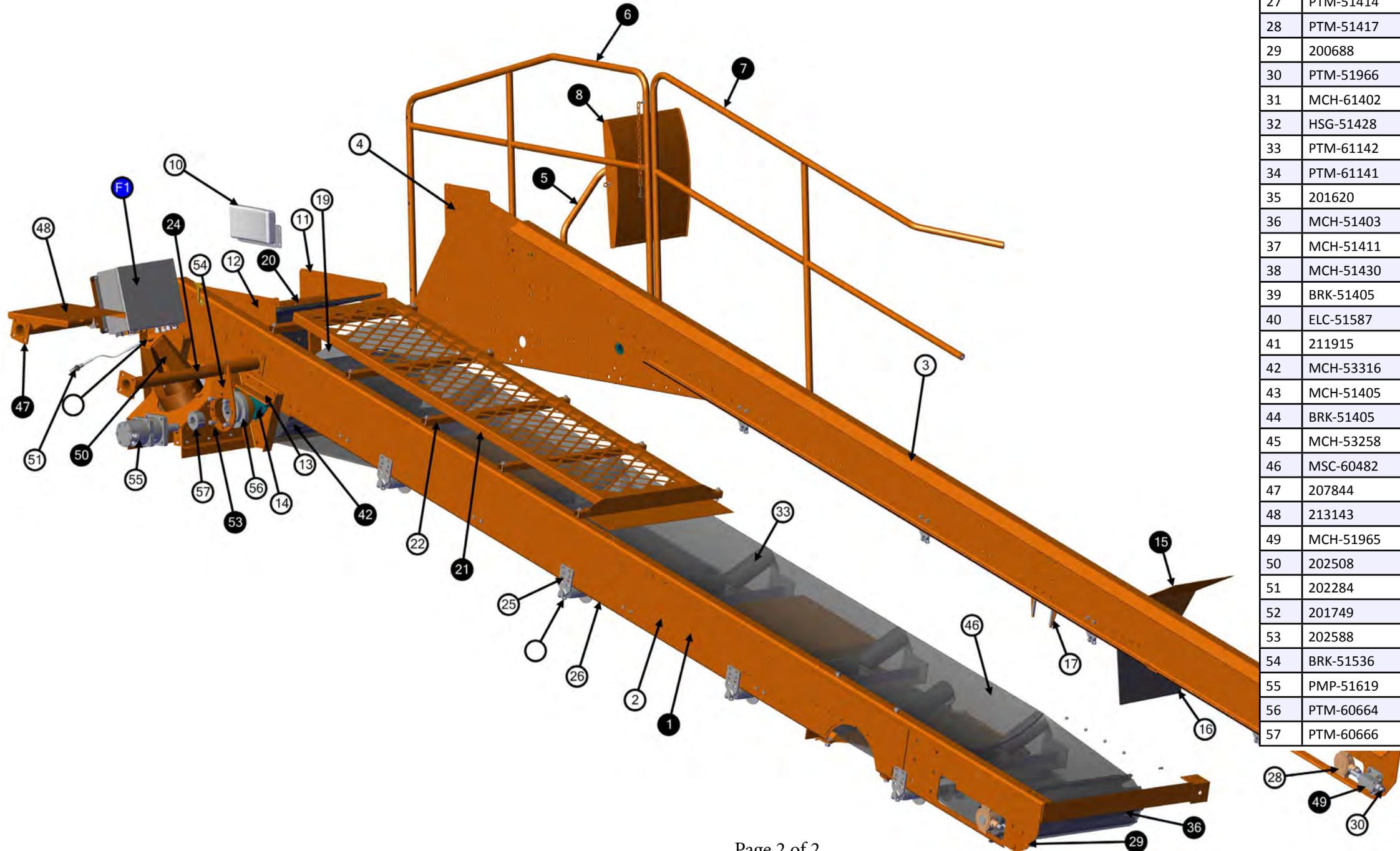


ID	Part #	Qty
58	200656	5
59	201949	1
60	202307	1
61	203118	2
62	205738	1
63	206357	1
64	206359	2
65	206443	1
66	209368	1
67	210174	1
68	ELC-24420	4
69	ELC-26255	2
70	ELC-53566	2
71	210148	1
72	206356	1
73	210158	1
74	200710	8
75	BRK-80694	4
76	210173	1
77	FAS-29365	2

F1 210157 Slave Box



F 213386 Right Conveyor Assembly Cont.



ID	10' Part #	8' Part #	Qty
27	PTM-51414	PTM-51414	9
28	PTM-51417	PTM-51417	2
29	200688	200688	1
30	PTM-51966	PTM-51966	2
31	MCH-61402	207594	5
32	HSG-51428	207698	2
33	PTM-61142	207599	12
34	PTM-61141	207599	5
35	201620	209336	1
36	MCH-51403	207692	1
37	MCH-51411	208008	1
38	MCH-51430	207693	1
39	BRK-51405	BRK-51405	2
40	ELC-51587	ELC-51587	1
41	211915	208087	1
42	MCH-53316	207689	1
43	MCH-51405	208007	1
44	BRK-51405	BRK-51405	2
45	MCH-53258	207691	1
46	MSC-60482	208009	1
47	207844	207844	1
48	213143	213143	1
49	MCH-51965	MCH-51965	1
50	202508	202508	1
51	202284	202284	1
52	201749	201749	1
53	202588	202588	1
54	BRK-51536	BRK-51536	1
55	PMP-51619	PMP-51619	1
56	PTM-60664	PTM-60664	1
57	PTM-60666	PTM-60666	1

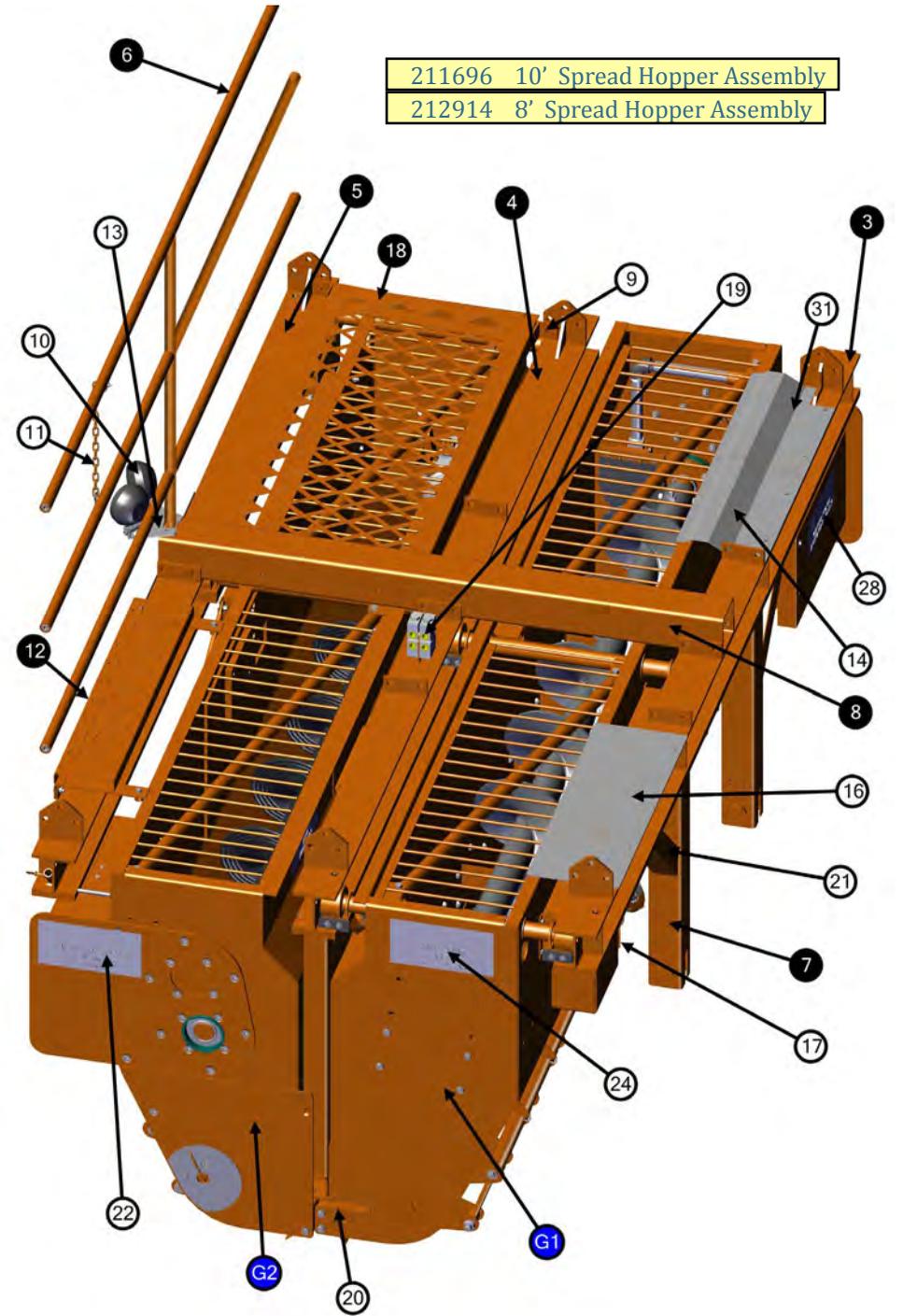
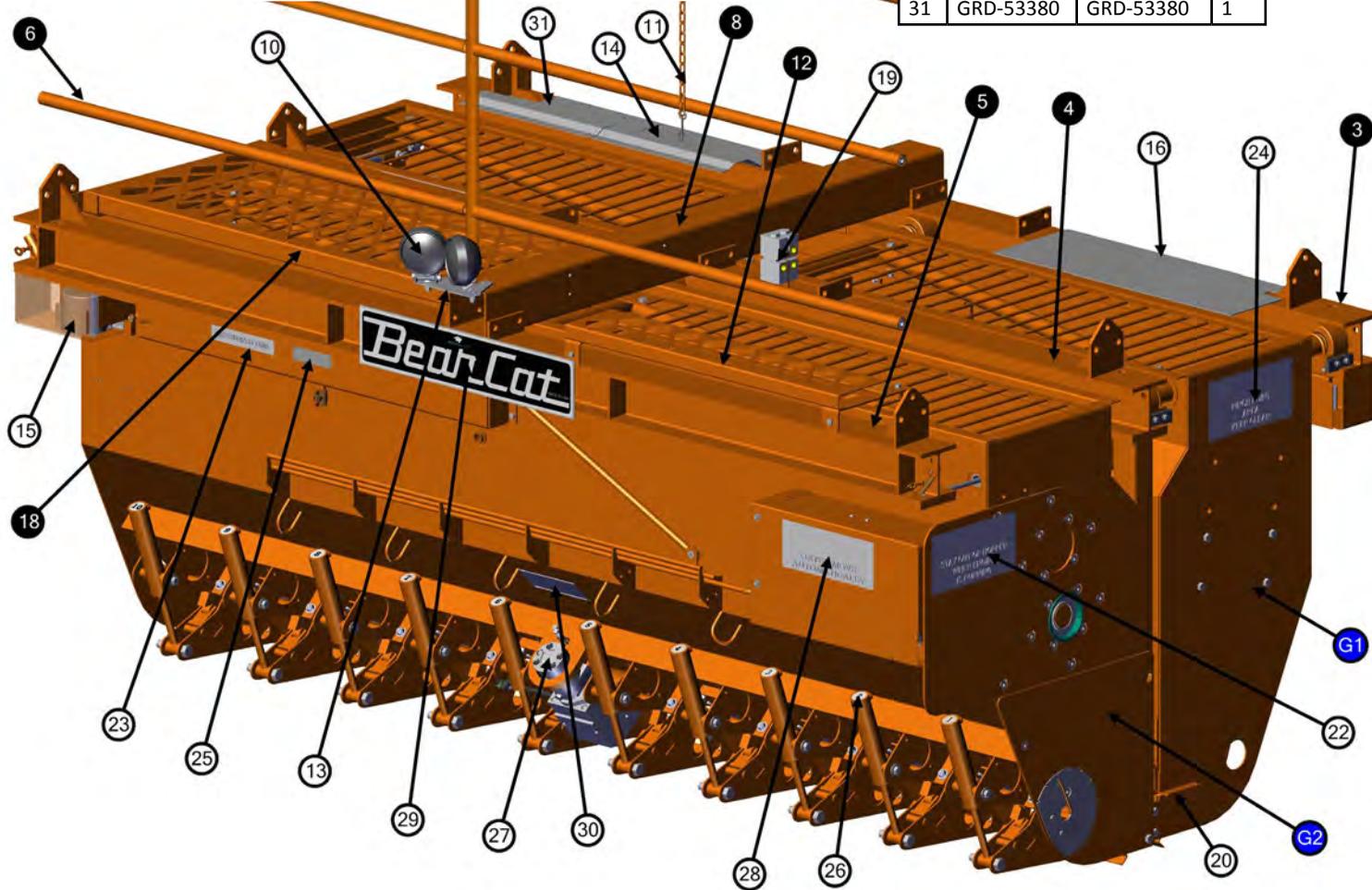
Parts

G SPREAD HOPPER ASSEMBLY

ID	10' Part #	8' Part #	Qty
G1	212008	212916	1
G2	212009	212915	1
3	211654	208036	1
4	211655	208046	1
5	211656	208039	1
6	211657	209115	1
7	BRK-53097	BRK-53097	2
8	BRK-53273	BRK-53273	1
9	BRK-53309	BRK-53309	1
10	ELC-51585	ELC-51585	2

ID	10' Part #	8' Part #	Qty
11	FAS-61052	FAS-61052	1
12	GRD-53311	207900	1
13	202568	202568	1
14	202596	202596	1
15	206917	206917	2
16	207360	211594	1
17	207363	207363	2
18	211692	207885	1
19	212021	212021	2
20	BRK-53090	207821	2

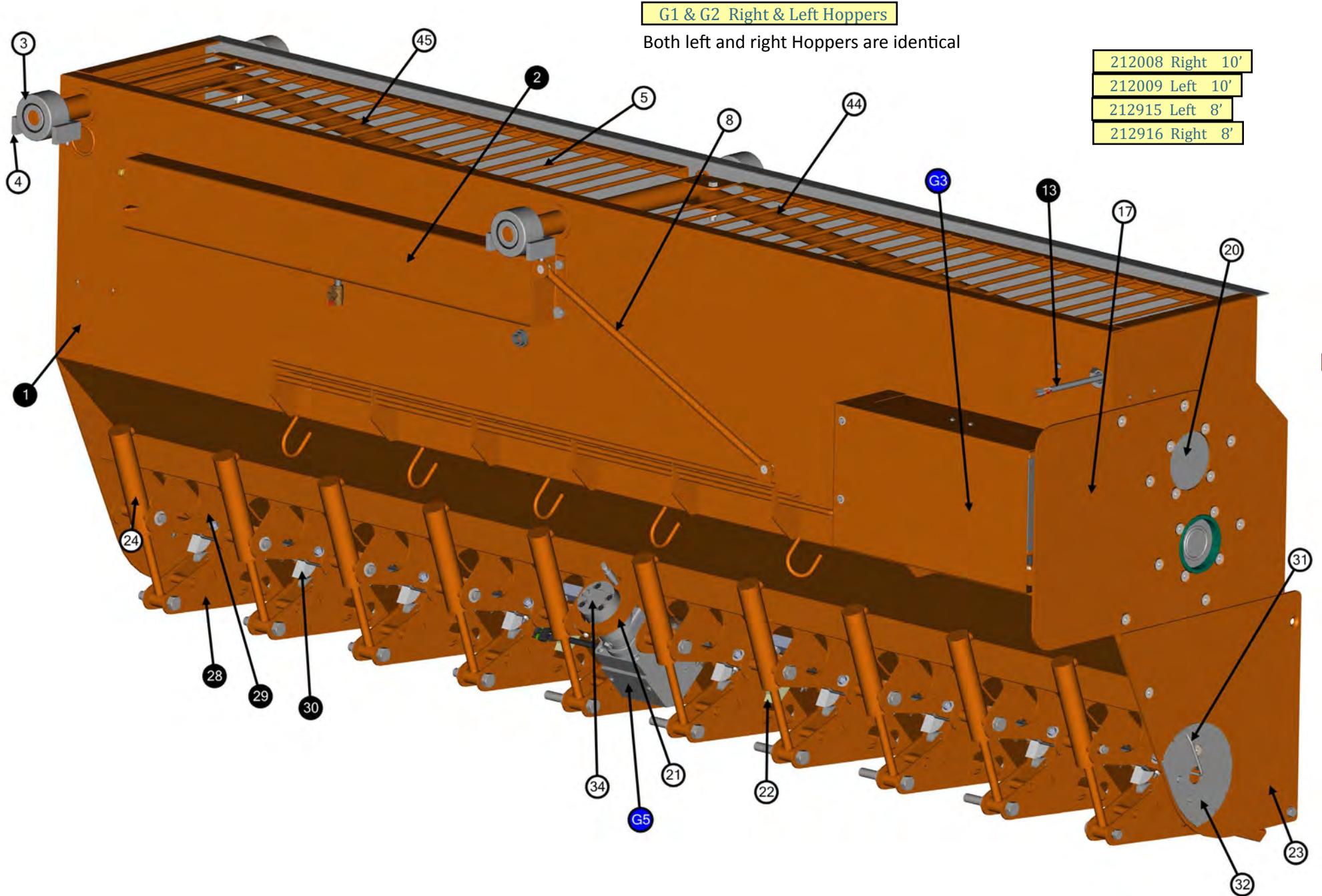
ID	10' Part #	8' Part #	Qty
21	BRK-53117	BRK-53117	2
22	DCL-51701	DCL-51701	2
23	DCL-51705	DCL-51705	2
24	DCL-51712	DCL-51712	4
25	DCL-51715	DCL-51715	2
26	DCL-51719	DCL-51719	20
27	DCL-51719	DCL-51719	1
28	DCL-51727	DCL-51727	2
29	DCL-51890	DCL-51890	1
30	DCL-61025	DCL-61025	2
31	GRD-53380	GRD-53380	1



211696 10' Spread Hopper Assembly
212914 8' Spread Hopper Assembly



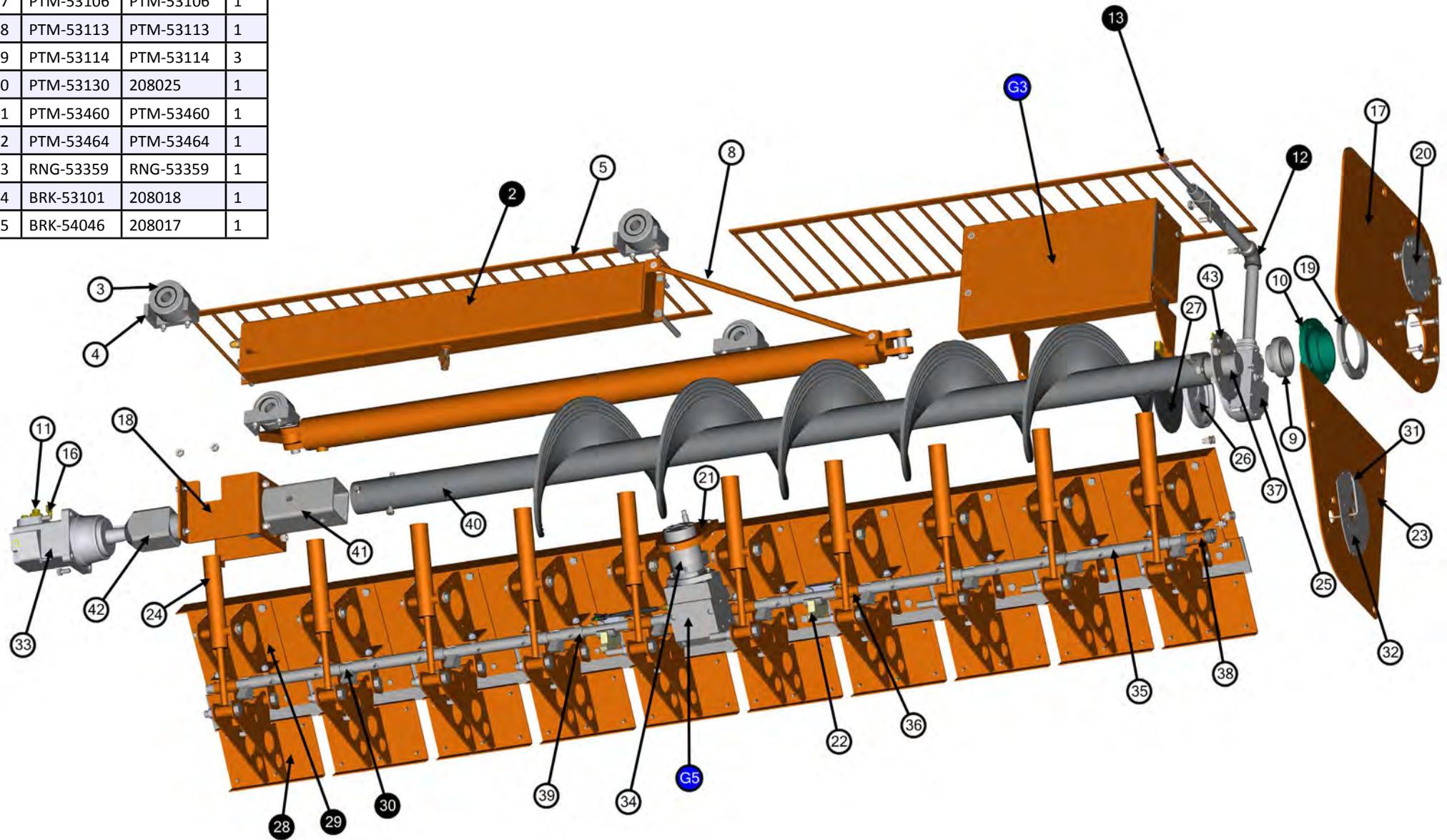
ID	10' Part #	8' Part #	Qty
G3	205689	205689	1
G5	211996	211996	1
1	HSG-53010	208012	1
2	TNK-53080	208029	1
3	PTM-53010	PTM-53010	4
4	206818	206818	4
5	GRD-53204	208031	2
8	GRD-53374	208540	1
13	204208	204208	1
17	BRK-53020	BRK-53020	1
20	BRK-53062	BRK-53062	1
21	BRK-53069	BRK-53069	1
22	BRK-53074	BRK-53074	2
23	BRK-53458	BRK-53458	1
24	CYL-50703	CYL-50703	10
28	MCH-53050	MCH-53050	9
29	MCH-53052	MCH-53052	9
30	MCH-53075	208034	1
31	MCH-53318	MCH-53318	1
32	MTR-53203	MTR-53203	1
34	PMP-53160	PMP-53160	1
44	BRK-53101	208018	1
45	BRK-54046	208017	1



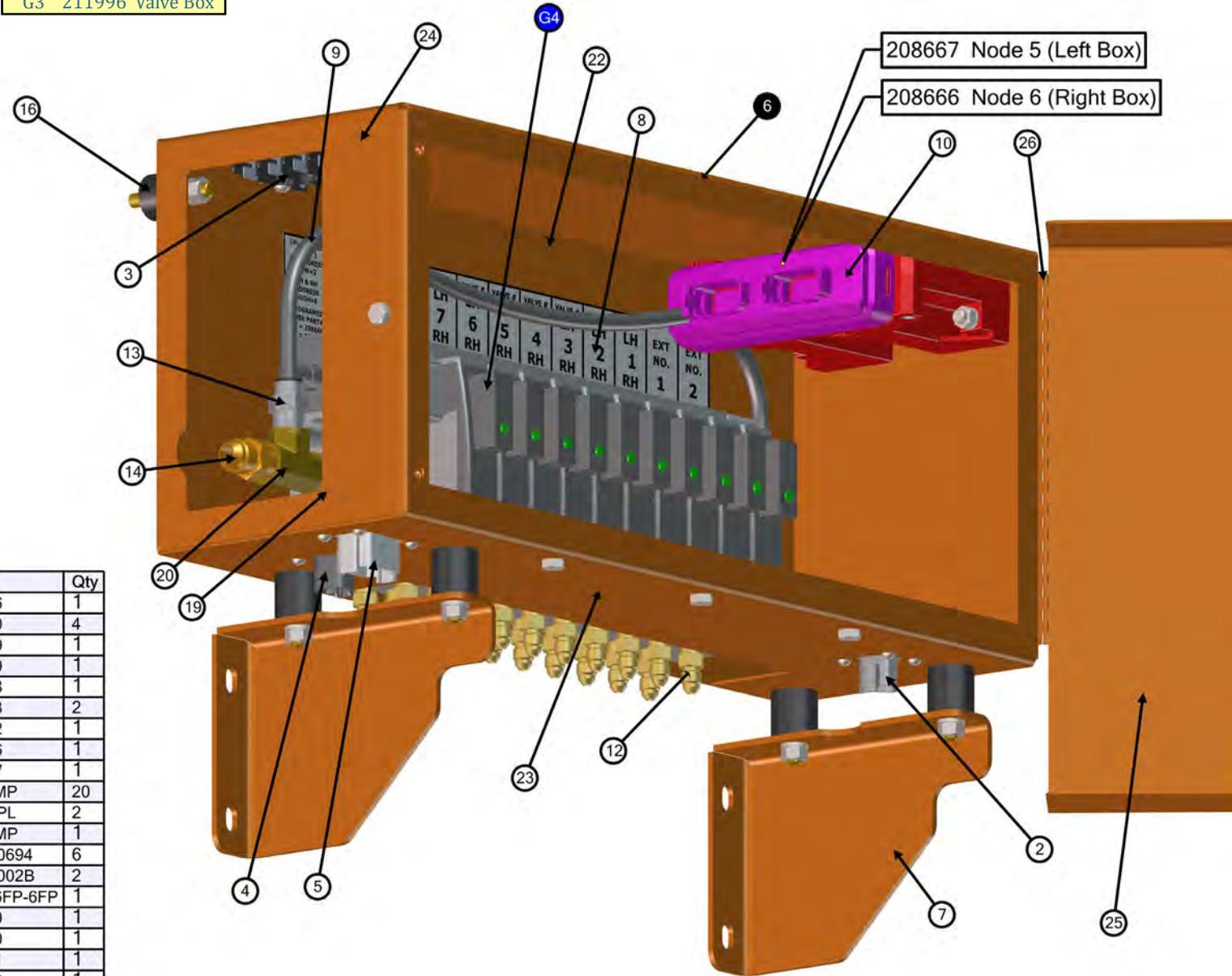
ID	10' Part #	8' Part #	Qty
G3	205689	205689	1
G5	211996	211996	1
1	HSG-53010	208012	1
2	TNK-53080	208029	1
3	PTM-53010	PTM-53010	4
4	206818	206818	4
5	GRD-53204	208031	2
8	GRD-53374	208540	1
9	123350	123350	1
10	124233H	124233H	1
11	12MB-8MF	12MB-8MF	2
12	202374	202374	1
13	204208	204208	1
16	4MB-4MF	4MB-4MF	1
17	BRK-53020	BRK-53020	1
18	BRK-53056	BRK-53056	1
19	BRK-53057	BRK-53057	1
20	BRK-53062	BRK-53062	1
21	BRK-53069	BRK-53069	1
22	BRK-53074	BRK-53074	2
23	BRK-53458	BRK-53458	1
24	CYL-50703	CYL-50703	10
25	ELC-50810	ELC-50810	1
26	ELC-50810	ELC-50810	1
27	HSG-50801	HSG-50801	1
28	MCH-53050	MCH-53050	9
29	MCH-53052	MCH-53052	9
30	MCH-53075	208034	1
31	MCH-53318	MCH-53318	1
32	MTR-53203	MTR-53203	1
33	PMP-51625	PMP-51625	1
34	PMP-53160	PMP-53160	1
35	PTM-53072	PTM-53072	6
36	PTM-53073	PTM-53073	4

ID	10' Part #	8' Part #	Qty
37	PTM-53106	PTM-53106	1
38	PTM-53113	PTM-53113	1
39	PTM-53114	PTM-53114	3
40	PTM-53130	208025	1
41	PTM-53460	PTM-53460	1
42	PTM-53464	PTM-53464	1
43	RNG-53359	RNG-53359	1
44	BRK-53101	208018	1
45	BRK-54046	208017	1

G1 & G2 Auger & Gate Detail

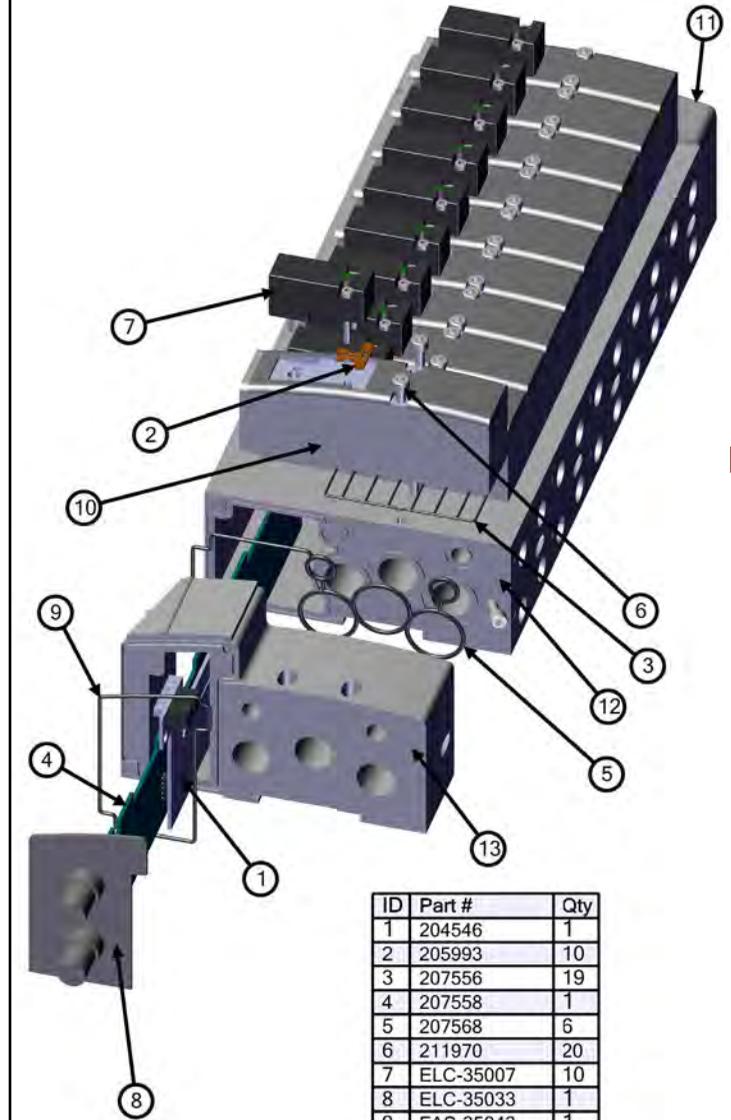


G3 211996 Valve Box



ID	Part #	Qty
2	200656	1
3	200710	4
4	201949	1
5	205739	1
6	207298	1
7	207383	2
8	207552	1
9	207736	1
10	208667	1
12	4MJ-4MP	20
13	6MP-6PL	2
14	8MJ-6MP	1
16	BRK-80694	6
19	FIT-28002B	2
20	T6FP-6FP-6FP	1
22	207299	1
23	207300	1
24	207301	1
25	207302	1
26	207303	1
G4	VLV-35008	1

G4 VLV-35008 Valve Bank

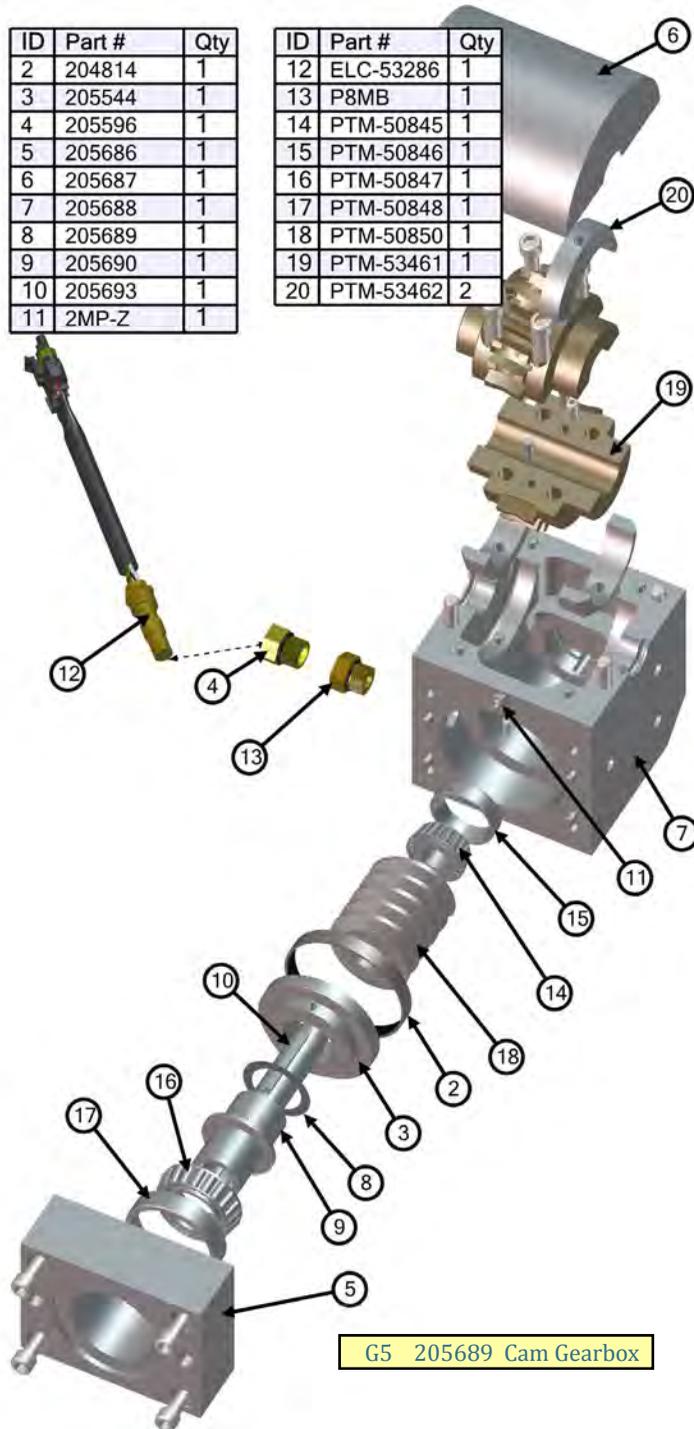


ID	Part #	Qty
1	204546	1
2	205993	10
3	207556	19
4	207558	1
5	207568	6
6	211970	20
7	ELC-35007	10
8	ELC-35033	1
9	FAS-35043	1
10	VLV-35008-2-1	10
11	VLV-35008-3	1
12	VLV-35008-5	5
13	VLV-35008-6	1

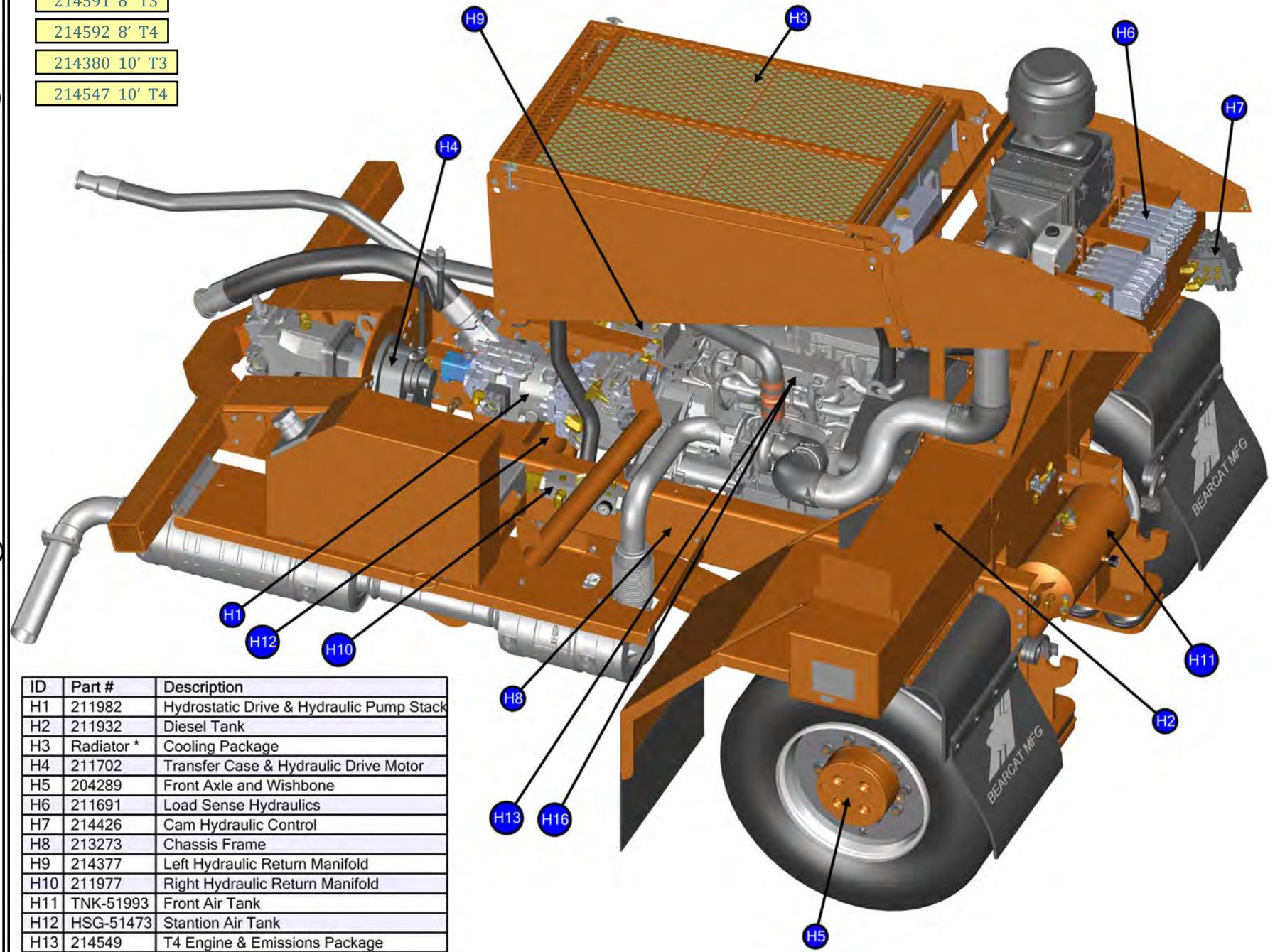
Parts

ID	Part #	Qty
2	204814	1
3	205544	1
4	205596	1
5	205686	1
6	205687	1
7	205688	1
8	205689	1
9	205690	1
10	205693	1
11	2MP-Z	1

ID	Part #	Qty
12	ELC-53286	1
13	P8MB	1
14	PTM-50845	1
15	PTM-50846	1
16	PTM-50847	1
17	PTM-50848	1
18	PTM-50850	1
19	PTM-53461	1
20	PTM-53462	2

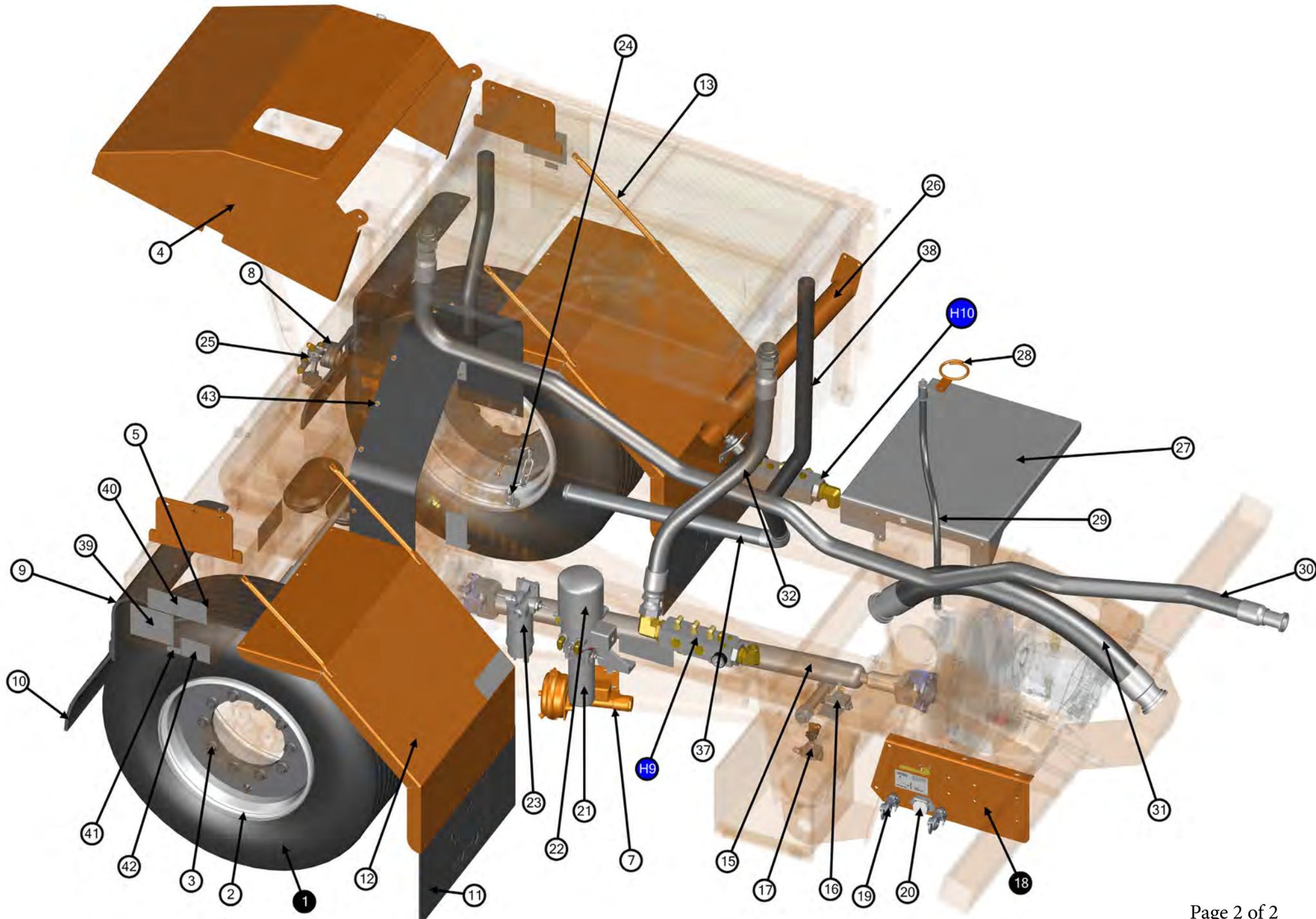


- 214591 8' T3
- 214592 8' T4
- 214380 10' T3
- 214547 10' T4



ID	Part #	Description
H1	211982	Hydrostatic Drive & Hydraulic Pump Stack
H2	211932	Diesel Tank
H3	Radiator *	Cooling Package
H4	211702	Transfer Case & Hydraulic Drive Motor
H5	204289	Front Axle and Wishbone
H6	211691	Load Sense Hydraulics
H7	214426	Cam Hydraulic Control
H8	213273	Chassis Frame
H9	214377	Left Hydraulic Return Manifold
H10	211977	Right Hydraulic Return Manifold
H11	TNK-51993	Front Air Tank
H12	HSG-51473	Stantion Air Tank
H13	214549	T4 Engine & Emissions Package
H16	214444	T3 Engine & Emissions Package

Email Part Sales: partsales@bearcatmfg.com

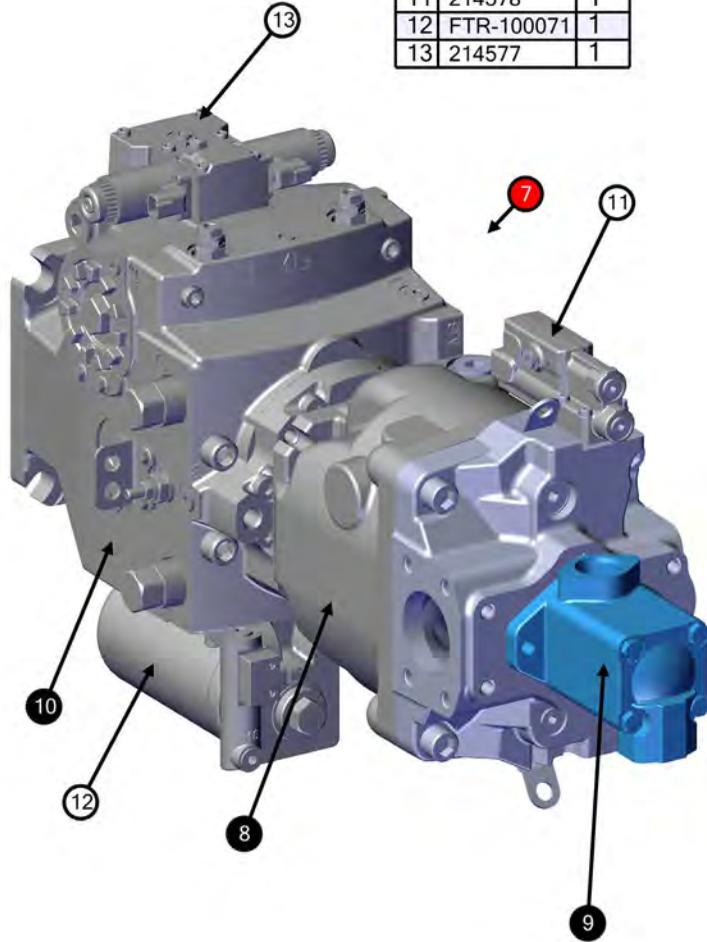


ID	Part #	Qty
1	OPT-53650	2
2	MSC-61466	2
3	FAS-51595	20
4	212035	1
5	MSC-100130	4
7	PTM-51644	1
8	BRK-23192	1
9	202235	2
10	202234	2
11	GRD-51815	2
12	GRD-53220	2
13	BRK-53221	4
14	216034	1
15	PTM-61570	1
16	202336	1
17	202335	1
18	212018	1
19	ELC-22375	2
20	ELC-60836	1
21	FF9579	1
22	FTR-60945	1
23	FS9922	1
24	BRK-60797	2
25	202291	1
26	213384	1
27	213681	1
28	RNG-53343	1
29	204058	1
30	214446	1
31	212859	1
32	214447	1
33	101713	1
34	212906	1
35	214529-1	1
36	FIT-29031	1
37	214529	1
38	214531	1
39	DCL-21214	2
40	DCL-51704	1
41	DCL-53708	2
42	DCL-61026	1
43	213603	1
H9	214377	1
H10	211977	1

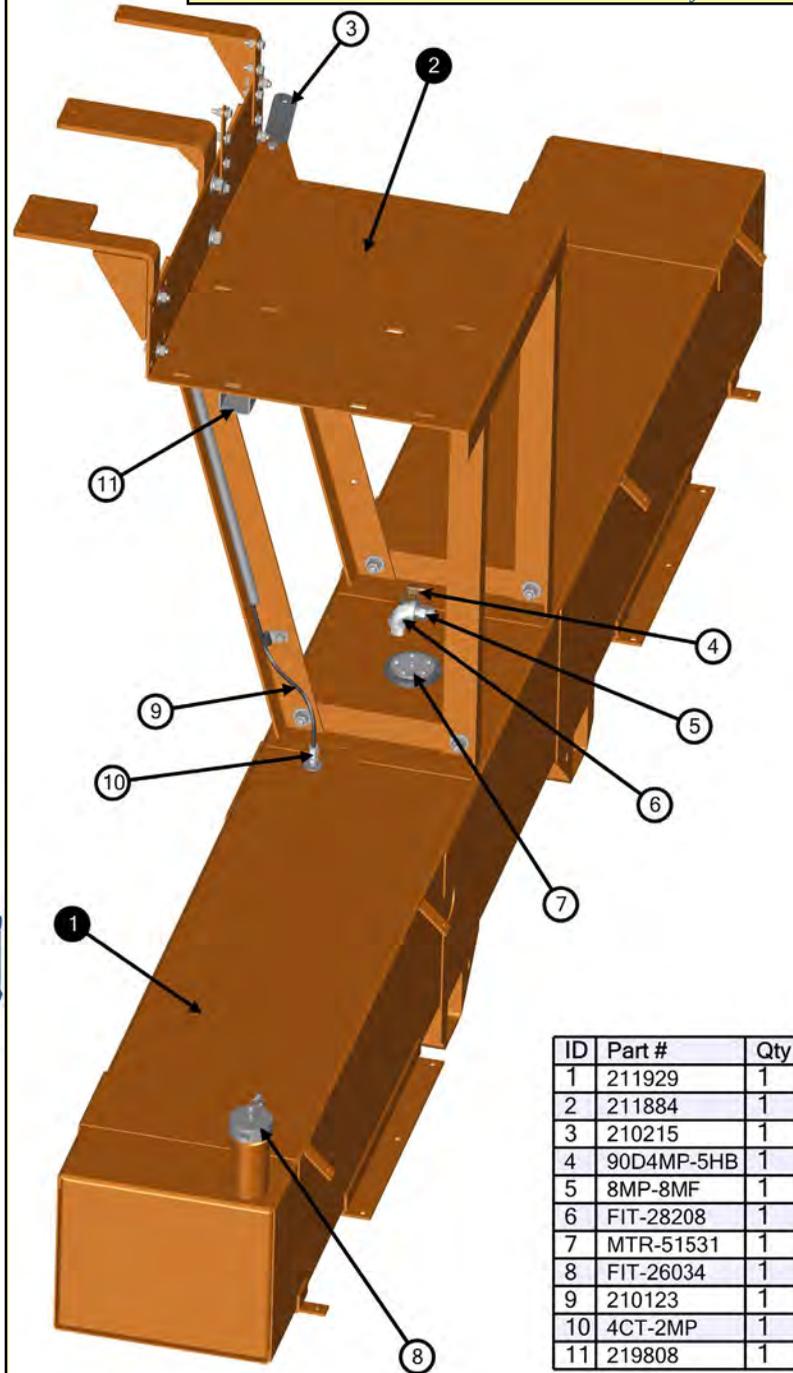
Parts

H1 211982 Hydrostatic Dive & Hydraulic Pump Stack

ID	Part #	Qty
7	211982	1
8	210035	1
9	210036	1
10	211708	1
11	214578	1
12	FTR-100071	1
13	214577	1

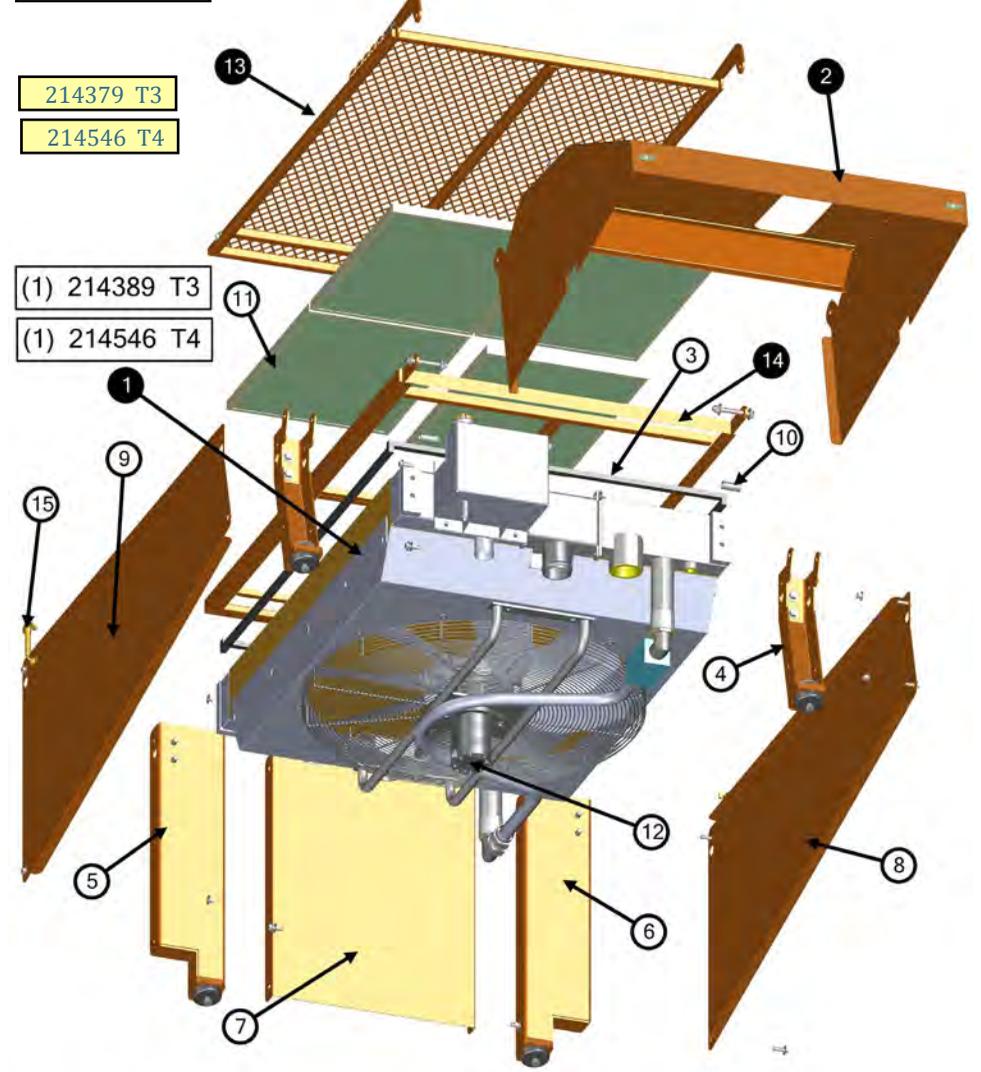


H2 211932 Diesel Tank & Load Sense Hydraulics



ID	Part #	Qty
1	211929	1
2	211884	1
3	210215	1
4	90D4MP-5HB	1
5	8MP-8MF	1
6	FIT-28208	1
7	MTR-51531	1
8	FIT-26034	1
9	210123	1
10	4CT-2MP	1
11	219808	1

H3 Radiator

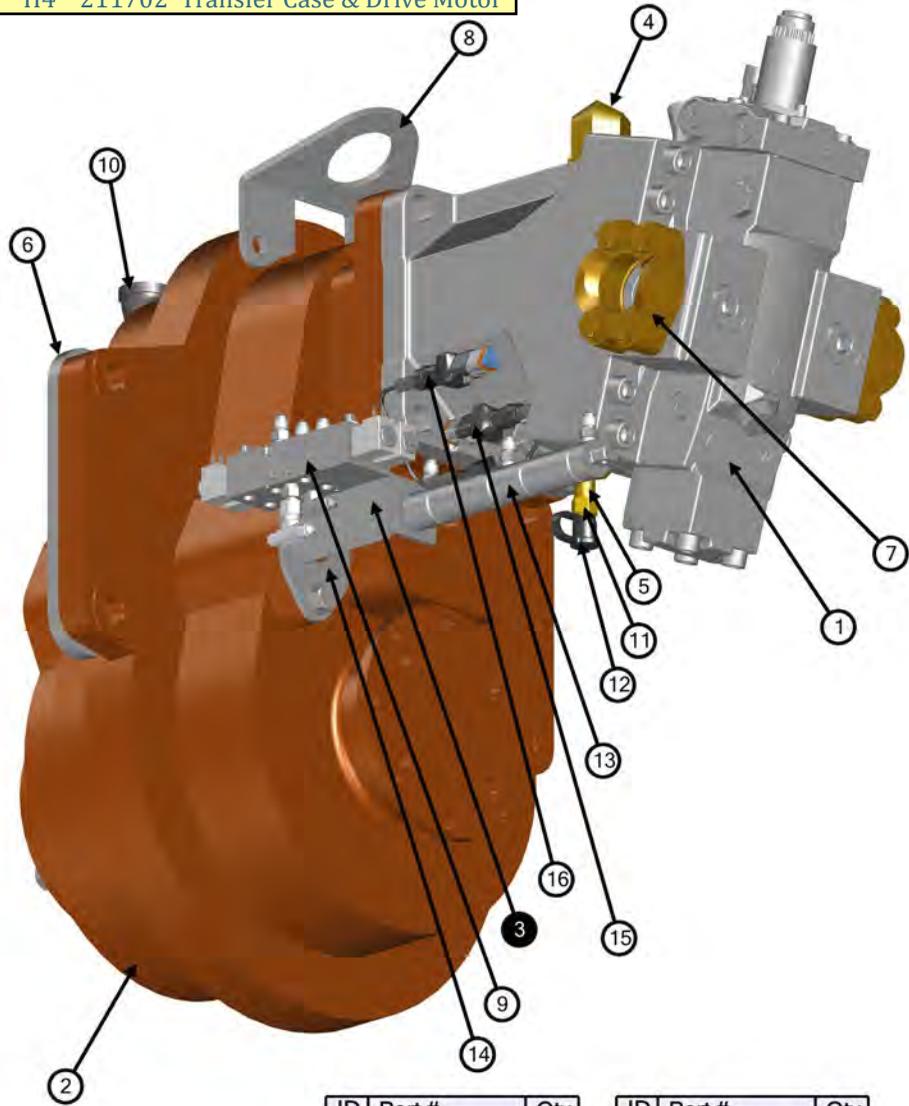


- 214379 T3
- 214546 T4
- (1) 214389 T3
- (1) 214546 T4

ID	Part #	Qty
1	Radiator *	1
2	212035	1
3	213130	1
4	213625	2
5	213629	1
6	213631	1
7	213633	1
8	213634	1

ID	Part #	Qty
9	213635	1
10	213639	2
11	209182	4
12	211291	1
13	214436	1
14	214437	1
15	FAS-24387	2

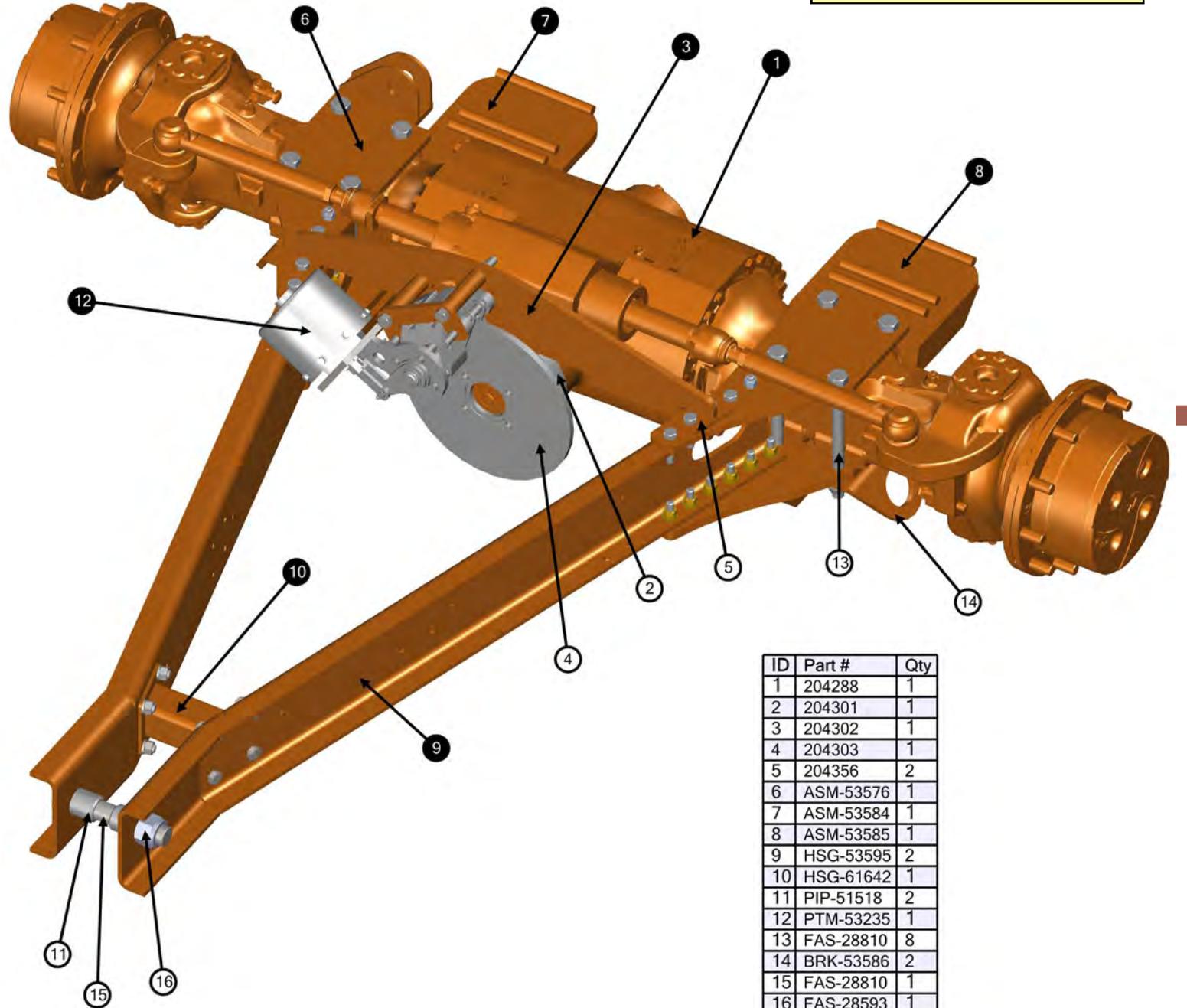
H4 211702 Transfer Case & Drive Motor



ID	Part #	Qty
1	211707	1
2	PTM-53160	1
3	202482	1
4	16MB-12MF90	1
5	16MB-4FB	1
6	207895	1
7	20FG62	2
8	BRK-53224	1
9	202547	2

ID	Part #	Qty
10	FIT-28209	1
11	FIT-53637	1
12	FIT-53638	1
13	202477	1
14	202478	1
15	204246	1
16	204246	1

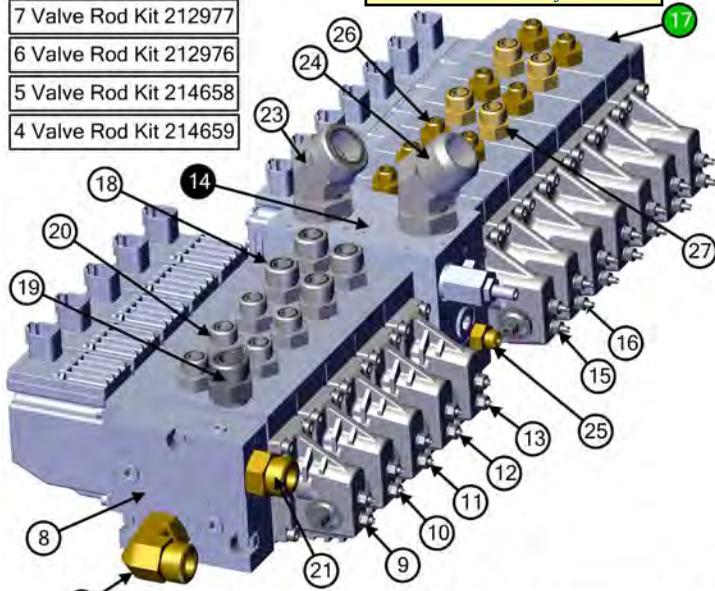
H5 204289 Front Axle Wishbone



ID	Part #	Qty
1	204288	1
2	204301	1
3	204302	1
4	204303	1
5	204356	2
6	ASM-53576	1
7	ASM-53584	1
8	ASM-53585	1
9	HSG-53595	2
10	HSG-61642	1
11	PIP-51518	2
12	PTM-53235	1
13	FAS-28810	8
14	BRK-53586	2
15	FAS-28810	1
16	FAS-28593	1

H6 211691 Hyd Valves

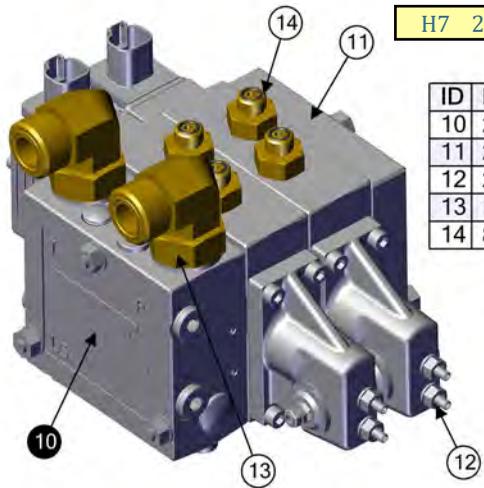
- 7 Valve Rod Kit 212977
- 6 Valve Rod Kit 212976
- 5 Valve Rod Kit 214658
- 4 Valve Rod Kit 214659



ID	Part #	Qty
8	212976	1
9	214662	1
10	214663	1
11	214663	1
12	214664	1
13	214664	1
14	210013	1
15	214661	1
16	210891	6
17	Valve Rod Kit	1
18	10MB-10MF	4

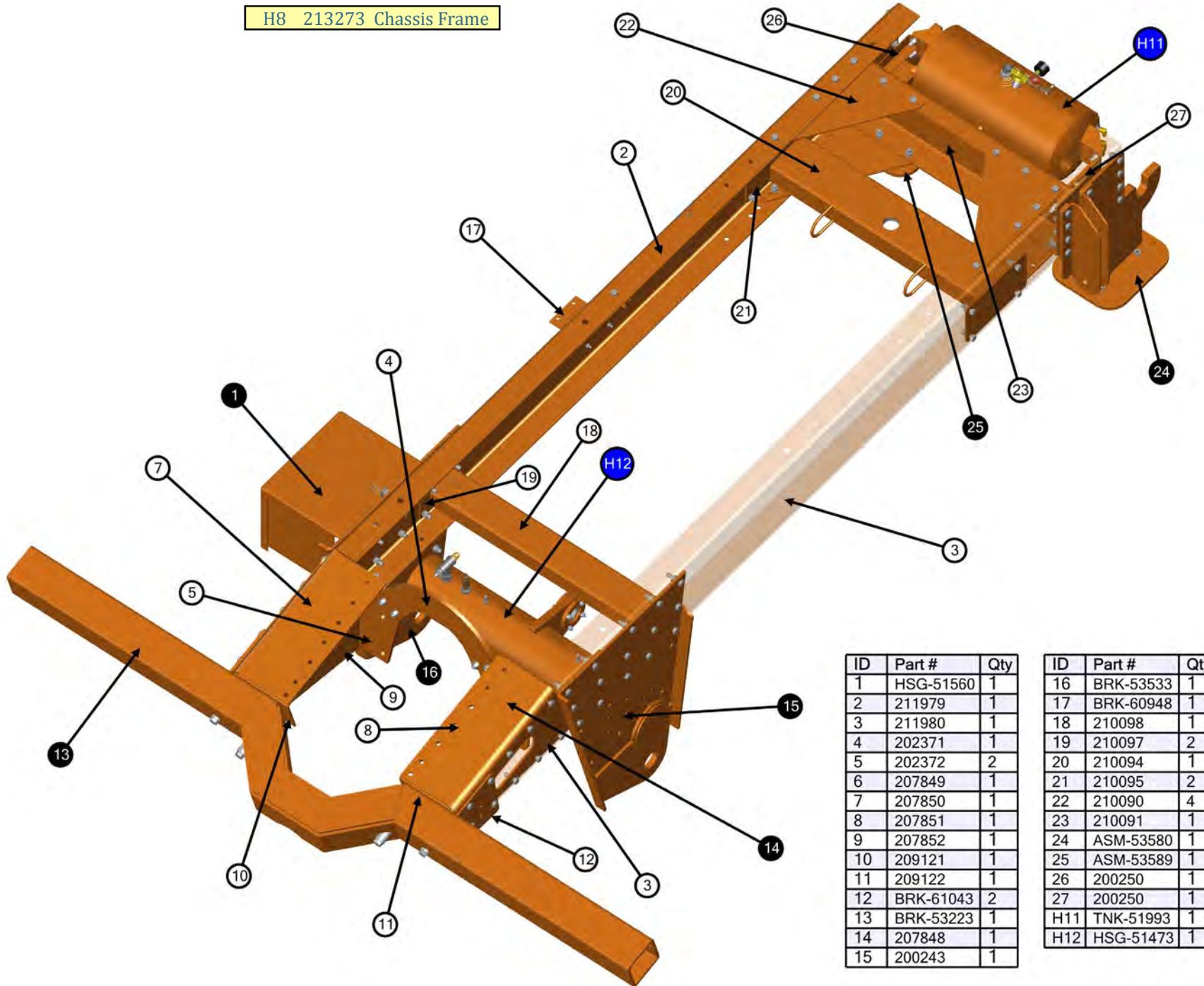
ID	Part #	Qty
19	10MB-12MF	1
20	10MB-8MF	5
21	12MB-12MF	1
22	12MB-12MF90	1
23	16MB-20MF45-5	1
24	45D16MB-20MJ-5	1
25	6MB-4MF	2
26	8MB-4MF	10
27	8MB-8MF	4

H7 214426 Hyd Valves



ID	Part #	Qty
10	210014	1
11	214665	1
12	214666	2
13	12MB-12MF90	2
14	8MB-4MF	4

H8 213273 Chassis Frame



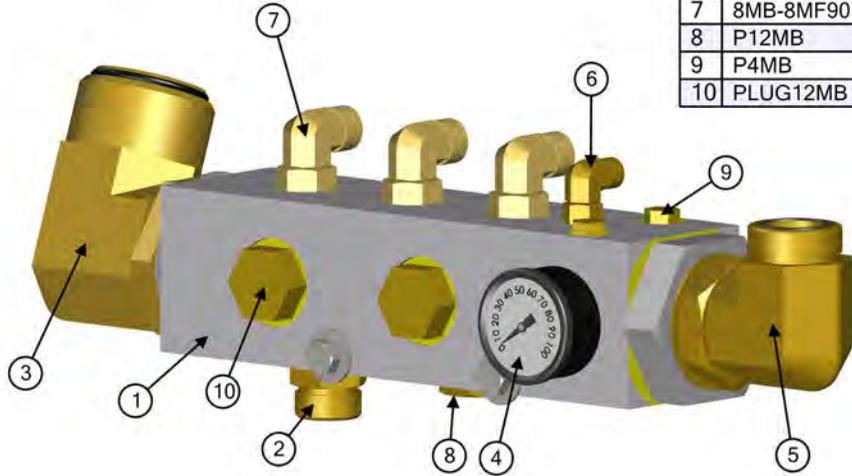
ID	Part #	Qty
1	HSG-51560	1
2	211979	1
3	211980	1
4	202371	1
5	202372	2
6	207849	1
7	207850	1
8	207851	1
9	207852	1
10	209121	1
11	209122	1
12	BRK-61043	2
13	BRK-53223	1
14	207848	1
15	200243	1

ID	Part #	Qty
16	BRK-53533	1
17	BRK-60948	1
18	210098	1
19	210097	2
20	210094	1
21	210095	2
22	210090	4
23	210091	1
24	ASM-53580	1
25	ASM-53589	1
26	200250	1
27	200250	1
H11	TNK-51993	1
H12	HSG-51473	1



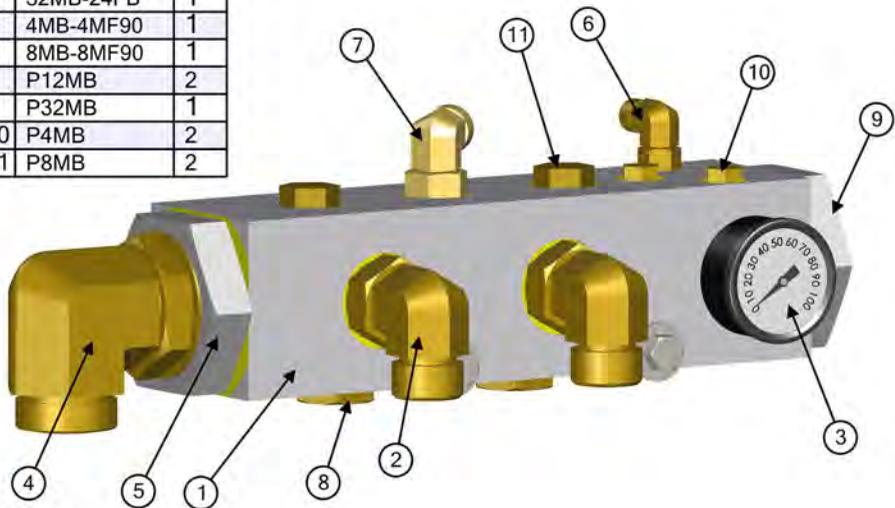
H9 214377 Left Hyd. Return Manifold

ID	Part #	Qty
1	MSC-53371	1
2	12MB-12MF	1
3	214378	1
4	214968	1
5	24MB-20MF90	1
6	4MB-4MF90	1
7	8MB-8MF90	3
8	P12MB	1
9	P4MB	2
10	PLUG12MB	2



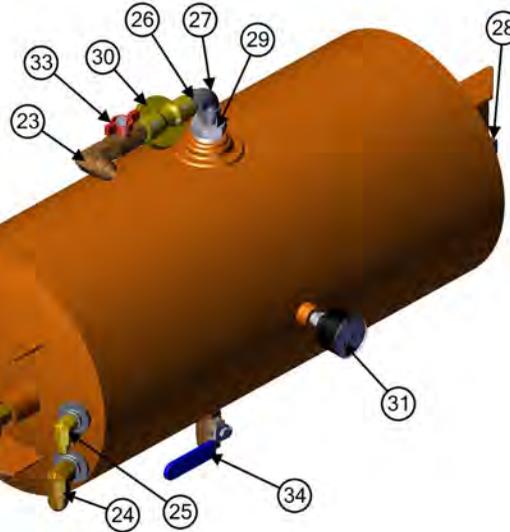
ID	Part #	Qty
1	MSC-53371	1
2	12MB-12MF90	2
3	214968	1
4	24MB-20MF90	1
5	32MB-24FB	1
6	4MB-4MF90	1
7	8MB-8MF90	1
8	P12MB	2
9	P32MB	1
10	P4MB	2
11	P8MB	2

H10 211977 Right Hyd. Return Manifold

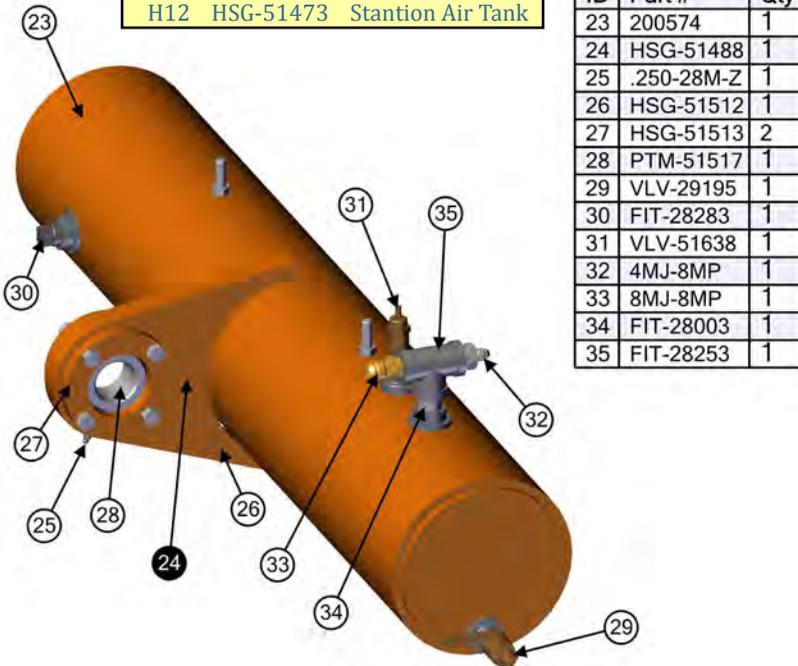


ID	Part #	Qty
23	90D8MJ-4MP	1
24	90D8MJ-6MP	2
25	90d4MJ-4MP	1
26	FIT-28001	4
27	FIT-28206	1
28	FIT-28283	1
29	FIT-28346	2
30	MTR-25225	1
31	MTR-50665	1
32	TNK-27300	1
33	VLV-29195	1
34	VLV-29200	1

H11 TNK-51993 Front Air Tank



H12 HSG-51473 Station Air Tank

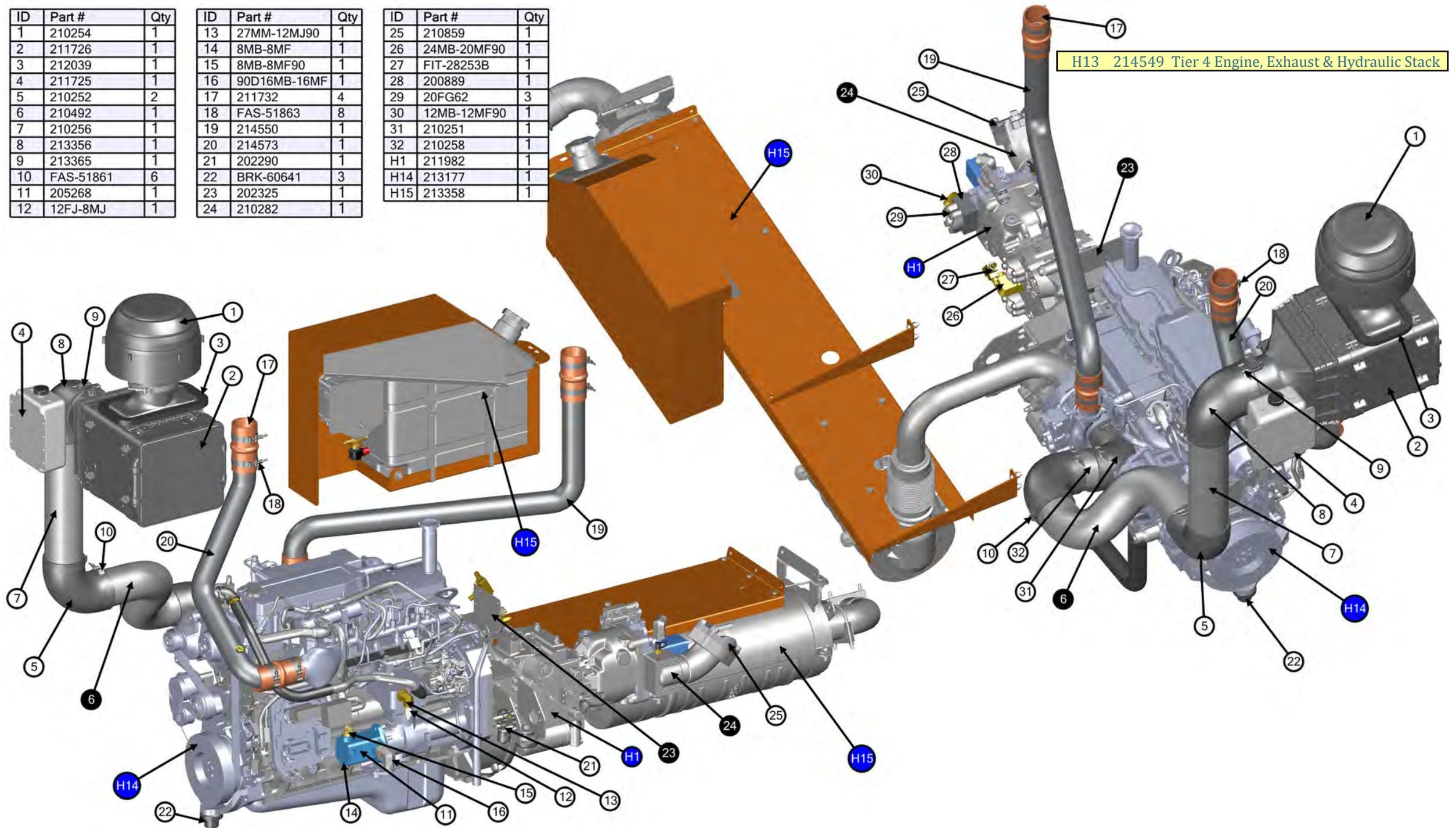


ID	Part #	Qty
23	200574	1
24	HSG-51488	1
25	.250-28M-Z	1
26	HSG-51512	1
27	HSG-51513	2
28	PTM-51517	1
29	VLV-29195	1
30	FIT-28283	1
31	VLV-51638	1
32	4MJ-8MP	1
33	8MJ-8MP	1
34	FIT-28003	1
35	FIT-28253	1

ID	Part #	Qty
1	210254	1
2	211726	1
3	212039	1
4	211725	1
5	210252	2
6	210492	1
7	210256	1
8	213356	1
9	213365	1
10	FAS-51861	6
11	205268	1
12	12FJ-8MJ	1

ID	Part #	Qty
13	27MM-12MJ90	1
14	8MB-8MF	1
15	8MB-8MF90	1
16	90D16MB-16MF	1
17	211732	4
18	FAS-51863	8
19	214550	1
20	214573	1
21	202290	1
22	BRK-60641	3
23	202325	1
24	210282	1

ID	Part #	Qty
25	210859	1
26	24MB-20MF90	1
27	FIT-28253B	1
28	200889	1
29	20FG62	3
30	12MB-12MF90	1
31	210251	1
32	210258	1
H1	211982	1
H14	213177	1
H15	213358	1





ID	Part #	Qty
1	BB9470	1
2	BB9473	1
3	BR9324	1
4	BR9479	1
5	CC9581	1
6	CC9590	1
7	CH9033	1
8	CP9574	1
9	DA9202	1
10	DL9338	1
11	EA9107	1
12	EE9246	1

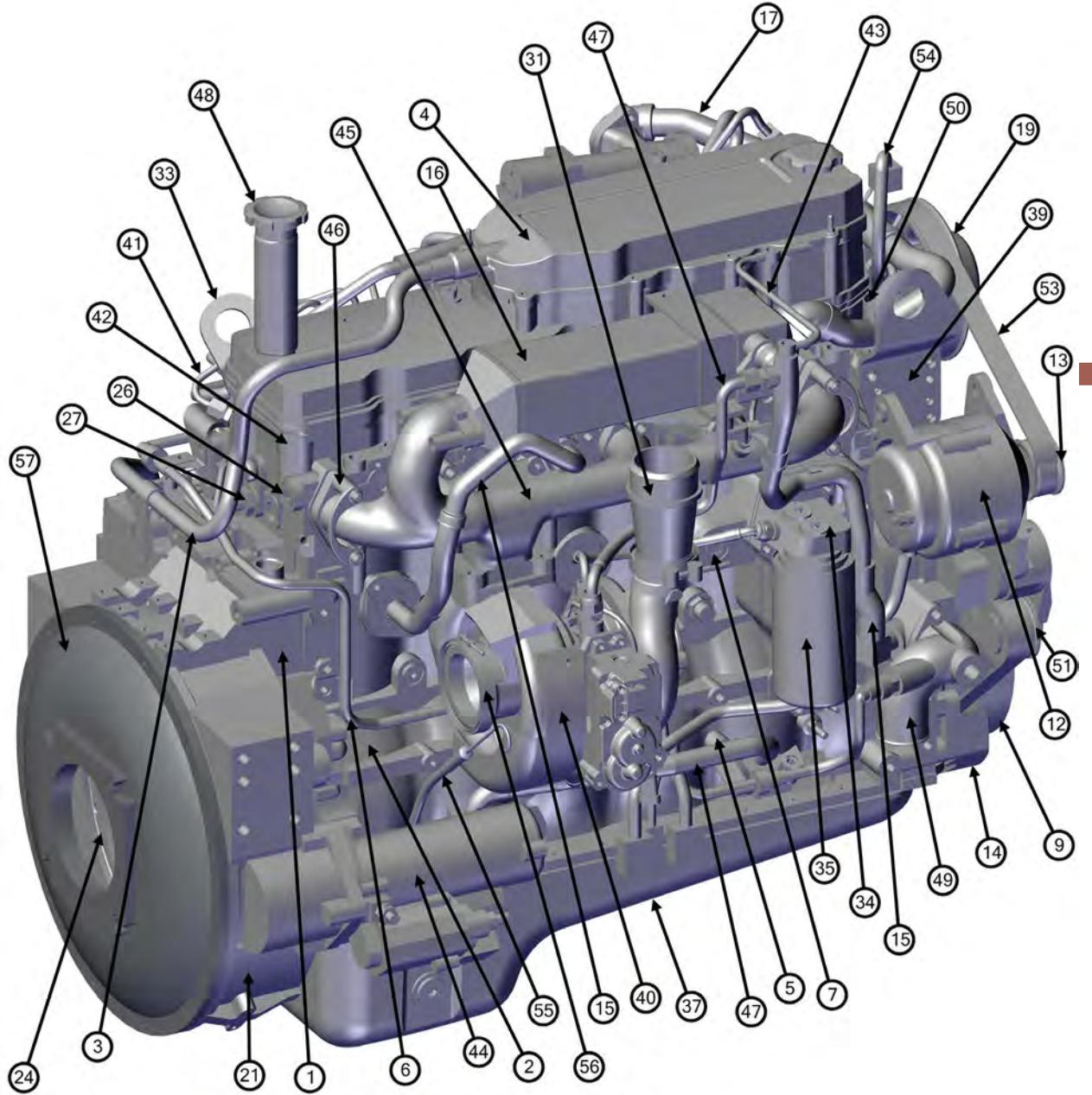
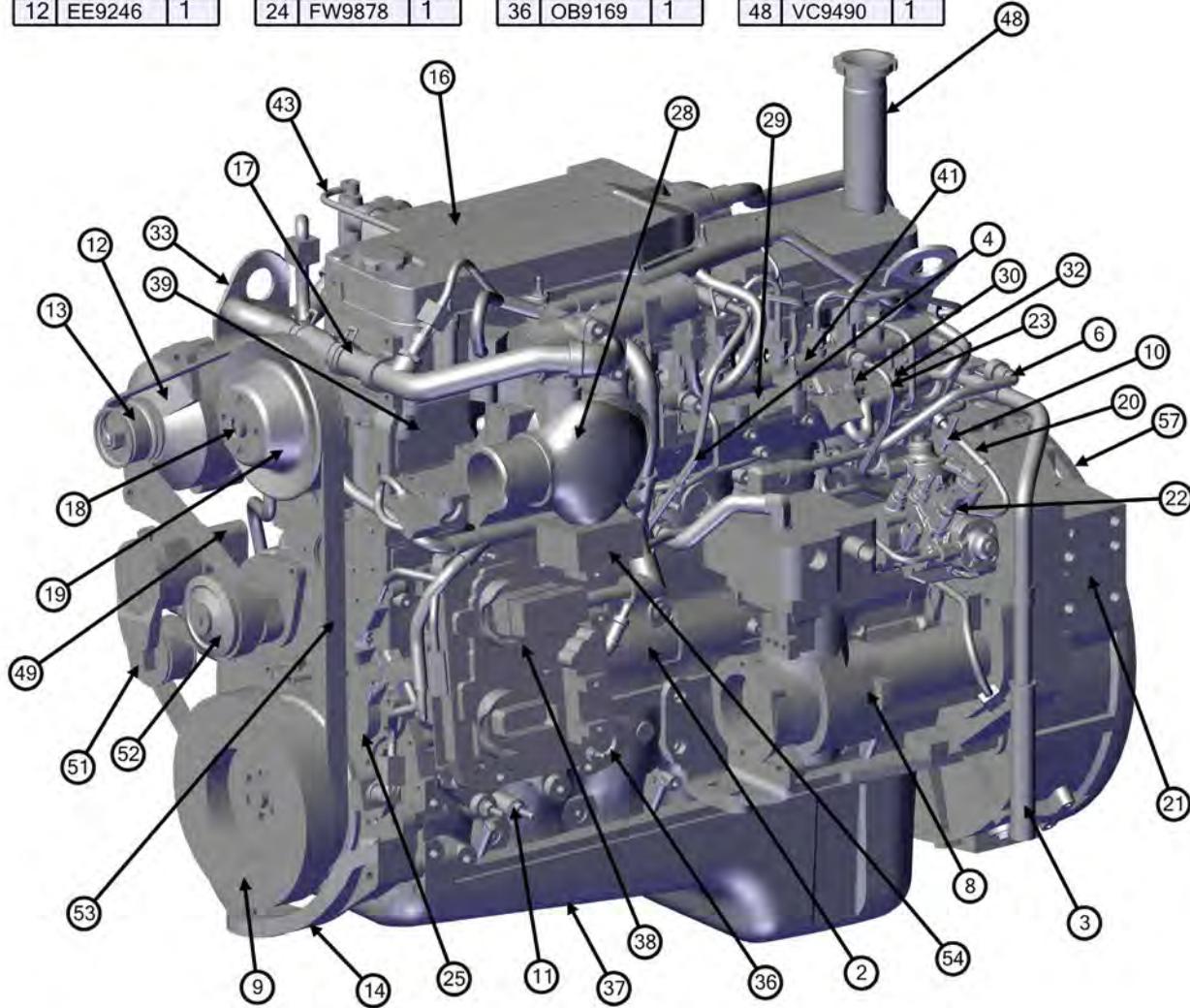
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13	EH97458	1
14	EM9194	1
15	ER9269	1
16	ER9295	1
17	ER9296	1
18	FA9735	1
19	FA9991	1
20	FD90041	1
21	FH9490	1
22	FP92681	1
23	FT9473	1
24	FW9878	1

ID	Part #	Qty
25	GG9887	1
26	HC9026	1
27	HE90019	1
28	IC9911	1
29	IM9237	1
30	IM9297	1
31	IT9071	1
32	LA9177	1
33	LA9180	1
34	LC9411	1
35	LF9136	1
36	OB9169	1

ID	Part #	Qty
37	OP9656	1
38	PH9482	1
39	PP43857	1
40	PP90326	1
41	PP9103	1
42	RL9784	1
43	RP9132	1
44	ST9492	1
45	TB91951	1
46	TB92296	1
47	TP97679	1
48	VC9490	1

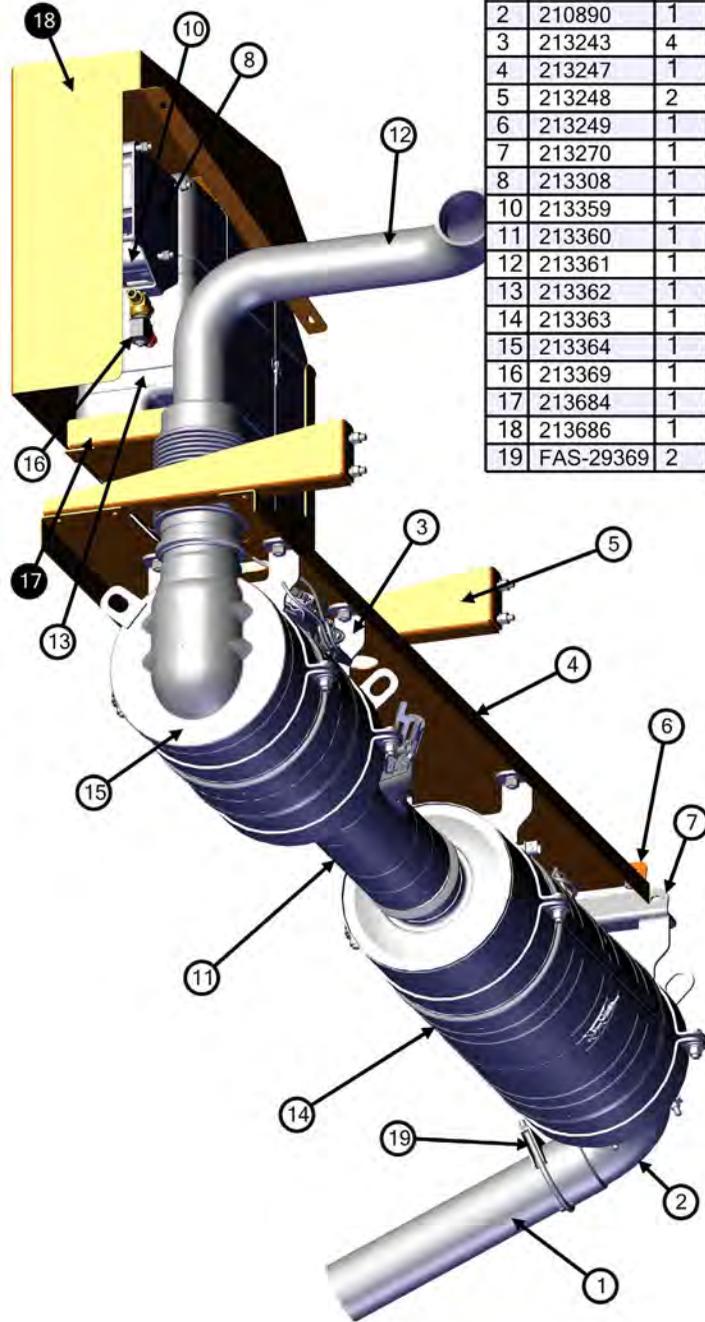
ID	Part #	Qty
49	WI9378	1
50	WO9172	1
51	WP97138	1
52	WP97496	1
53	WP9983	1
54	WR90120	1
55	LG90580	1
56	XS9258	1
57	123008	1

H14 213177 Tier 4 Engine



Parts

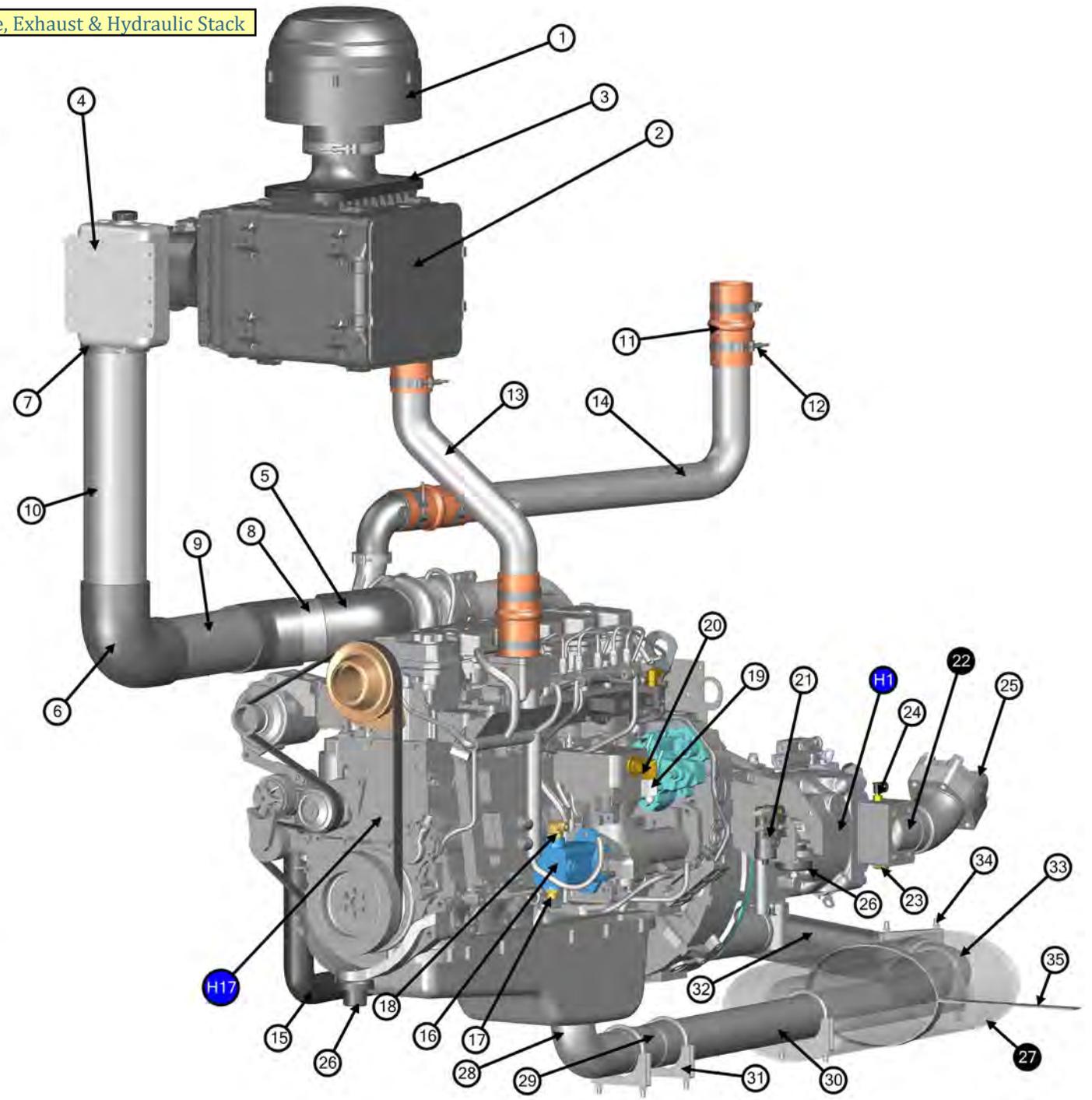
H15 213358 Tier 4 Exhaust



ID	Part #	Qty
1	209384	1
2	210890	1
3	213243	4
4	213247	1
5	213248	2
6	213249	1
7	213270	1
8	213308	1
10	213359	1
11	213360	1
12	213361	1
13	213362	1
14	213363	1
15	213364	1
16	213369	1
17	213684	1
18	213686	1
19	FAS-29369	2

H16 214444 Tier 3 Engine, Exhaust & Hydraulic Stack

ID	Part #	Qty
1	210254	1
2	211726	1
3	212039	1
4	211725	1
5	elbow 45 5x5	2
6	elbow 5x5	1
7	elbow 6x5	1
8	213171	1
9	213172	1
10	213173	1
11	211732	4
12	FAS-51863	8
13	214527	1
14	214528	1
15	213052	1
16	205268	1
17	8MB-8MF	1
18	8MB-8MF90	1
19	12FJ-8MJ	1
20	27MM-12MJ90	1
21	VLV-51637	1
22	210282	1
23	8MB-8MF90	1
24	FIT-53637	1
25	210859	1
26	BRK-60641	3
27	211735	1
28	200805	1
29	200806	1
30	211736	1
31	FAS-53613	4
32	209384	1
33	FIT-51883	1
34	FAS-29369	2
35	200803	1
H1	211982	1
H17	201662-X	1





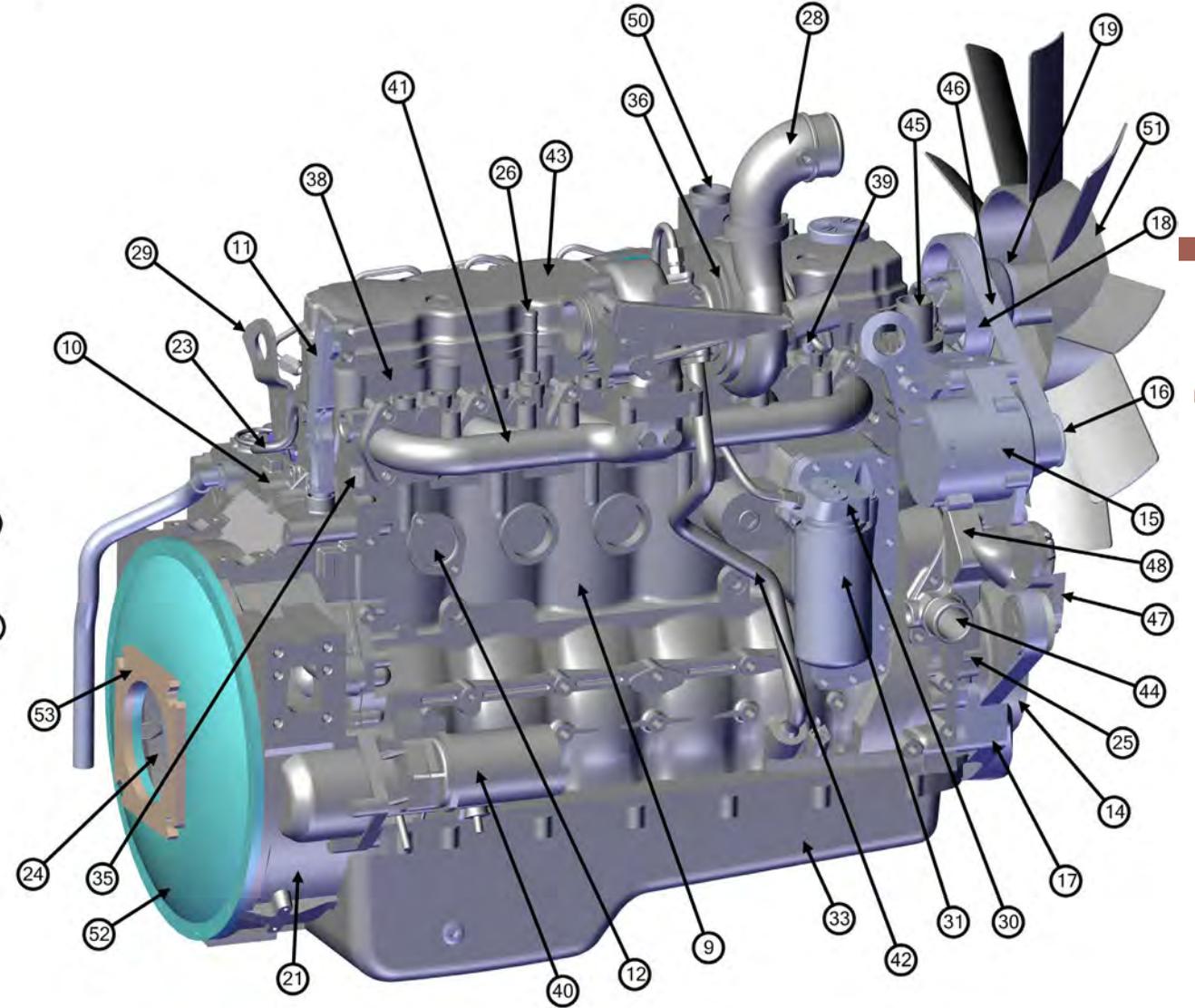
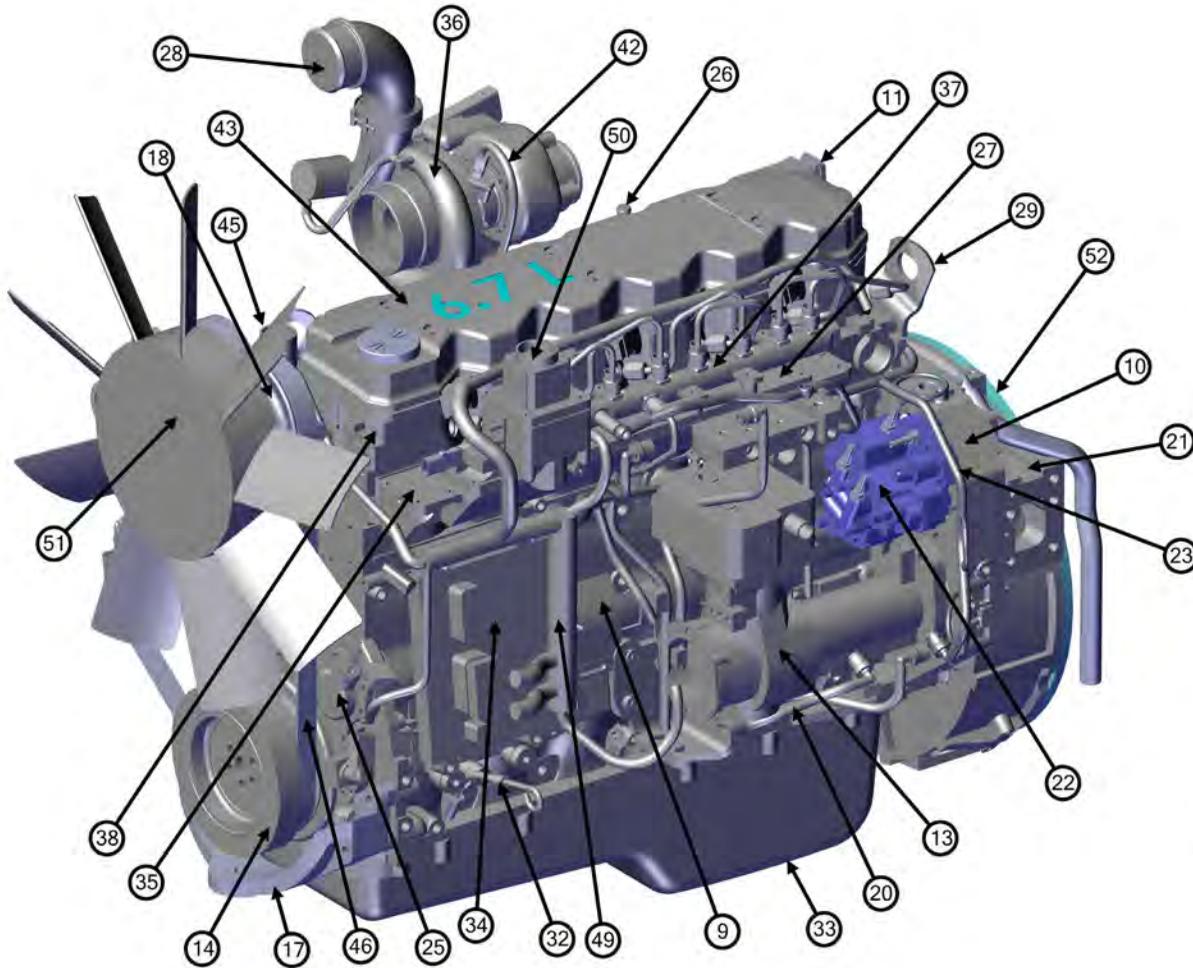
ID	Part #	Qty
9	BB9118	1
10	BB9131	1
11	BR9191	1
12	CH9070	1
13	CP9574	1
14	DA9168	1
15	EE9242	1
16	EH9472	1
17	EM9194	1
18	FA9335	1
19	FA9735	1
20	FF9573	1

ID	Part #	Qty
21	FH9490	1
22	FP90313	1
23	FT9111	1
24	FW9857	1
25	GG9808	1
26	HC9041	1
27	IM9061	1
28	IT9001	1
29	LA9145	1
30	LC9244	1
31	LF9136	1
32	LG9460	1

ID	Part #	Qty
33	OP9456	1
34	PH9113	1
35	PP98490	1
36	PP98667	1
37	PP98668	1
38	RL9765	1
39	RP9046	1
40	ST9383	1
41	TB91137	1
42	TP97318	1
43	VC9304	1
44	WI9178	1

ID	Part #	Qty
45	WO9026	1
46	WP97042	1
47	WP97056	1
48	WP9757	1
49	WR9325	1
50	WATER OUTLET	1
51	5.9L FAN	1
52	BELL HOUSING	1
53	PUMP MOUNT	1

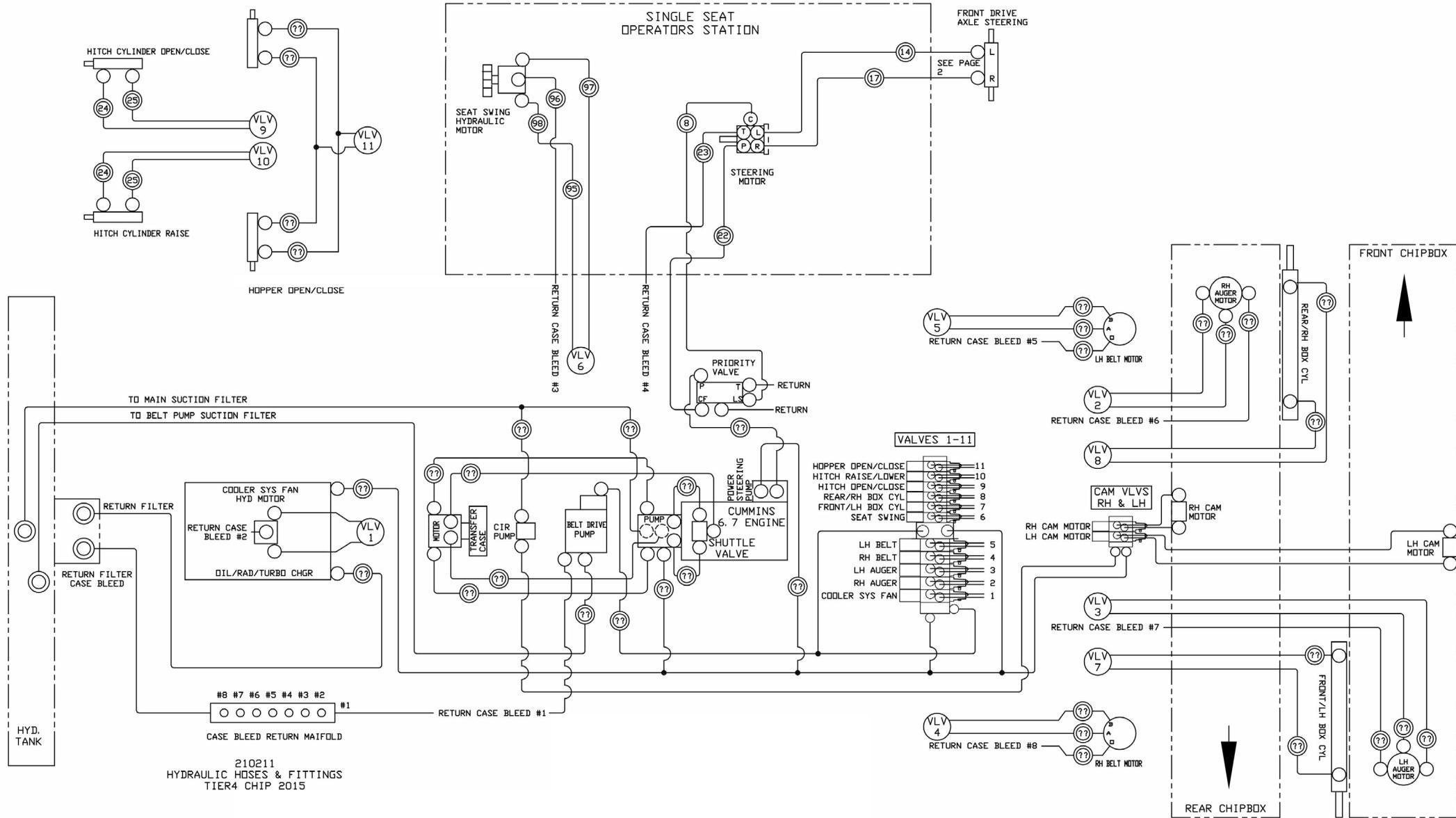
H17 201662 Tier 3 Engine



Parts

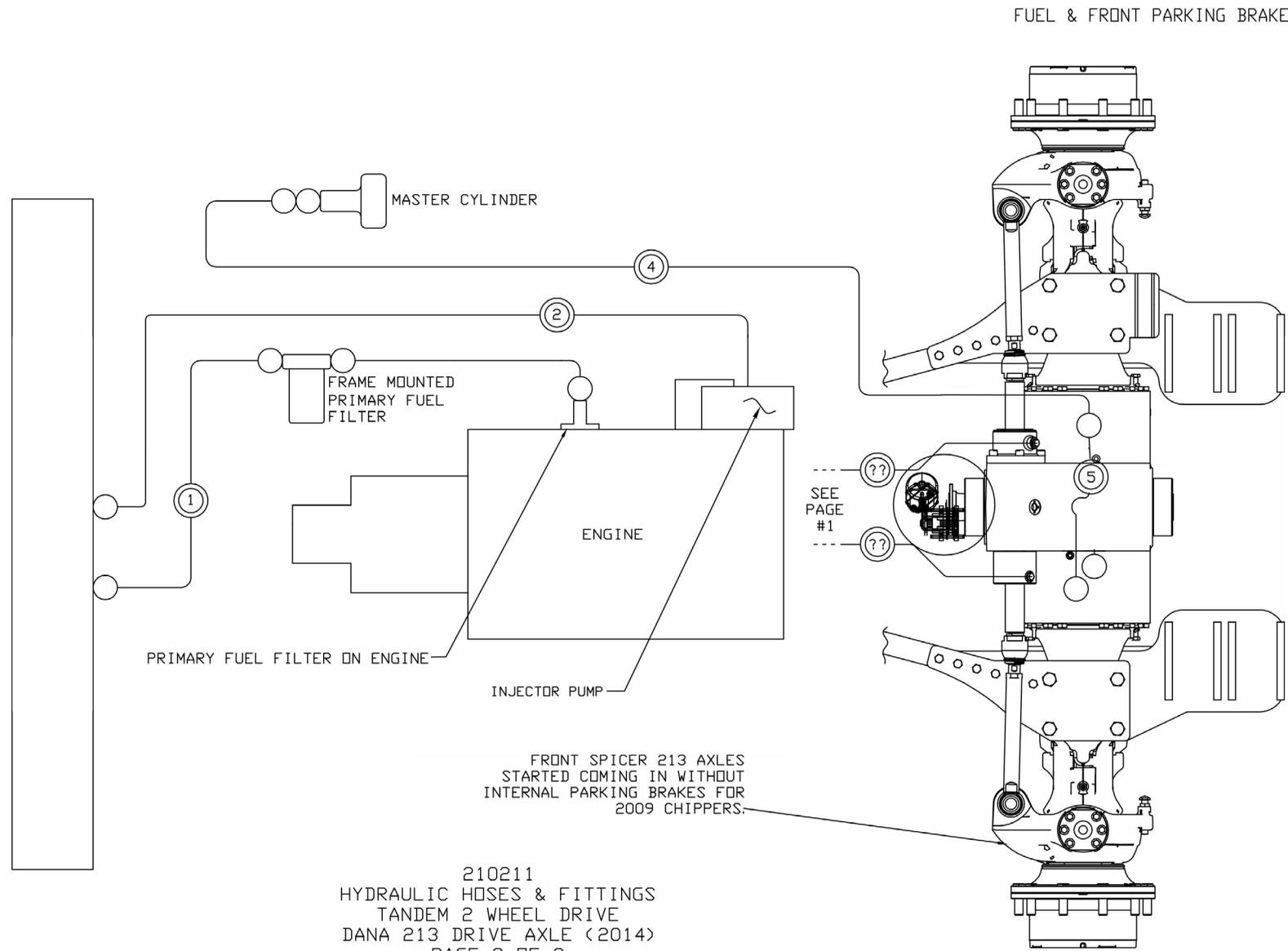


Hydraulics 210211 1 of 2



210211
HYDRAULIC HOSES & FITTINGS
TIER4 CHIP 2015

DT/NEXT ASS'Y	MADE BY BEARCAT		
7-111111111	APPROVED		
	MATERIAL		
	SEE PRINTED B. O. M.		
FINAL ASS'Y			
7-111111111			
	FINISH		
STANDARD	.X .XX .XXX XXXX ANG. X/X	AUTHOR RH	DATE 8-26-13
TOLERANCE	F.08 1.015 ±.005 ±.0005 4.0 ±.1/32	SCALE NONE	SHEET 1 OF 2

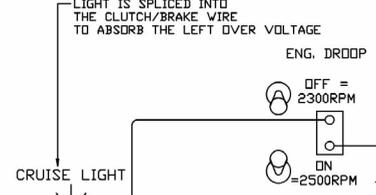
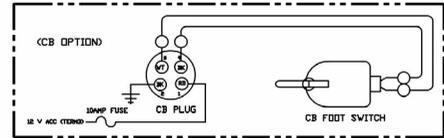
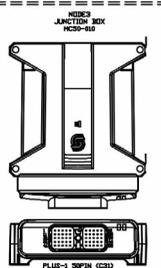
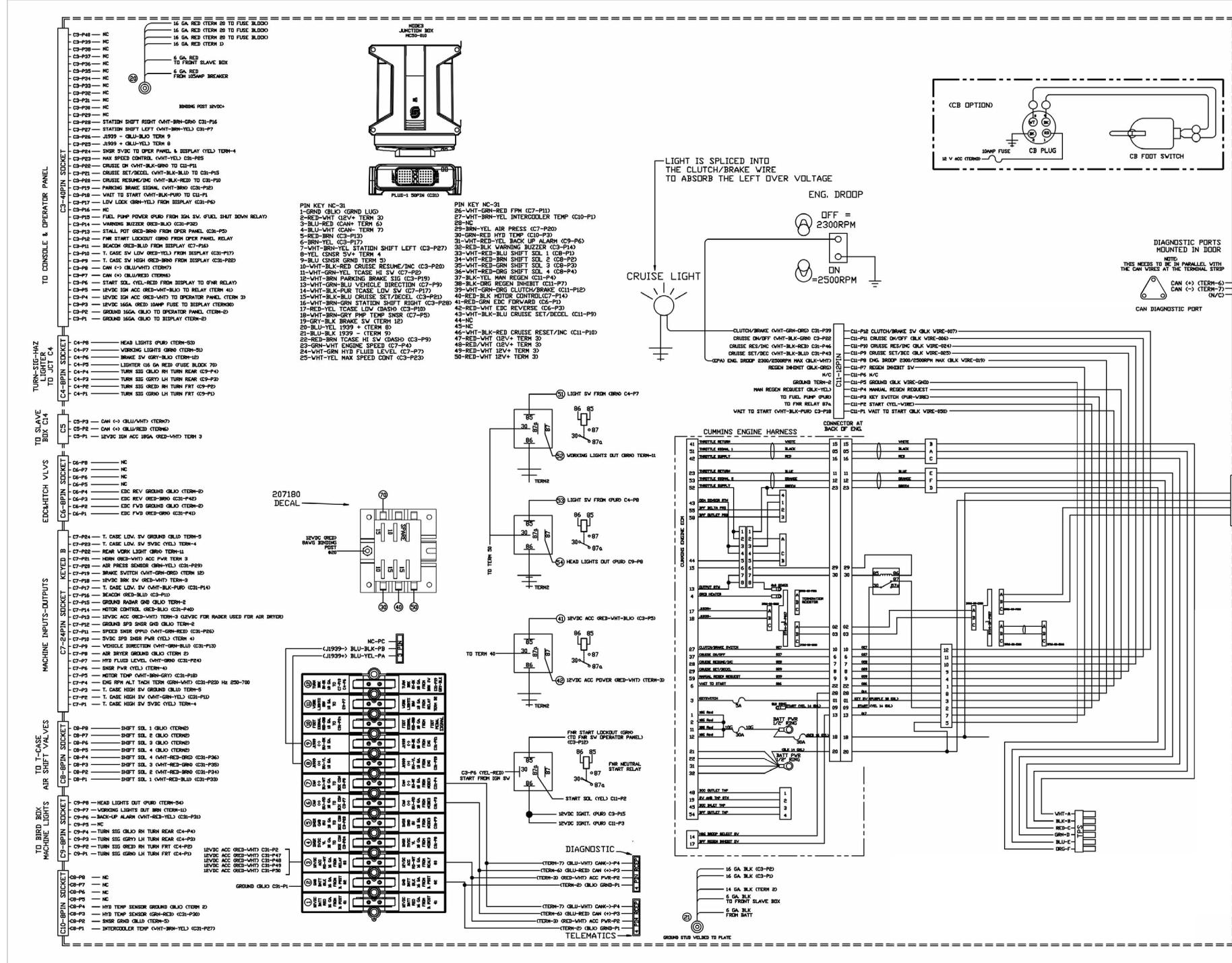


210211
 HYDRAULIC HOSES & FITTINGS
 TANDEM 2 WHEEL DRIVE
 DANA 213 DRIVE AXLE (2014)
 PAGE 2 OF 2

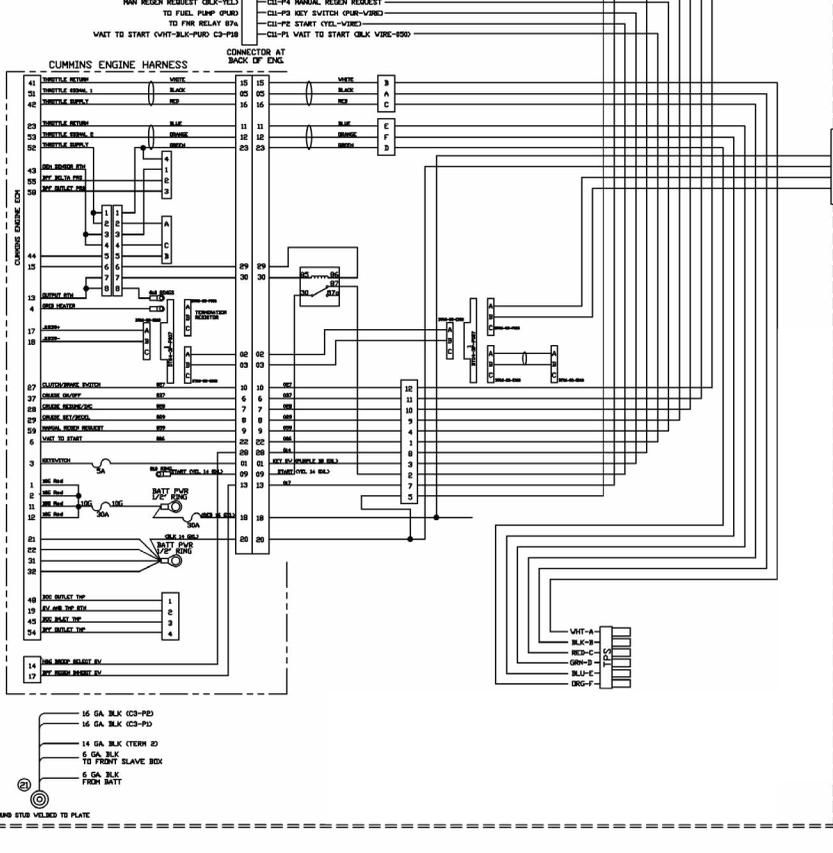
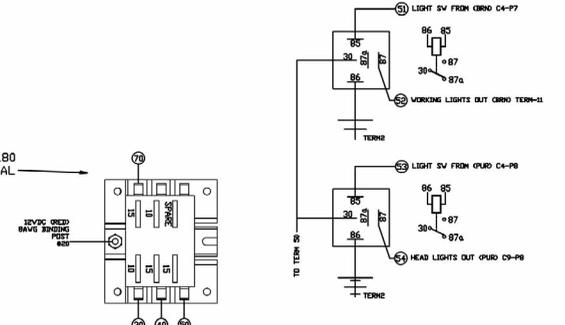
QTY/NEXT ASS'Y	MADE BY BEARCAT	 350 MAIN ROAD RD. VICKENBURG, AZ 85390 (928) 694-7861 M.F.S.	
7-1111111111	APPROVED		
	MATERIAL		
	SEE PRINTED B. O. M.		
FINAL ASS'Y		TITLE	
7-1111111111		SCHE HYD CHIP TIER4 2015	
	FINISH	PART NO.	
		210211	
STANDARD	.X .XX .XXX XXXX ANG X/X	AUTHOR	RH
TOLERANCE	F. 00 ± 015 ± 005 ± 0005 4, 0 1/32	SCALE	NONE
		DATE	8-26-13
			SHEET 2 OF 2



Junction Box 210313



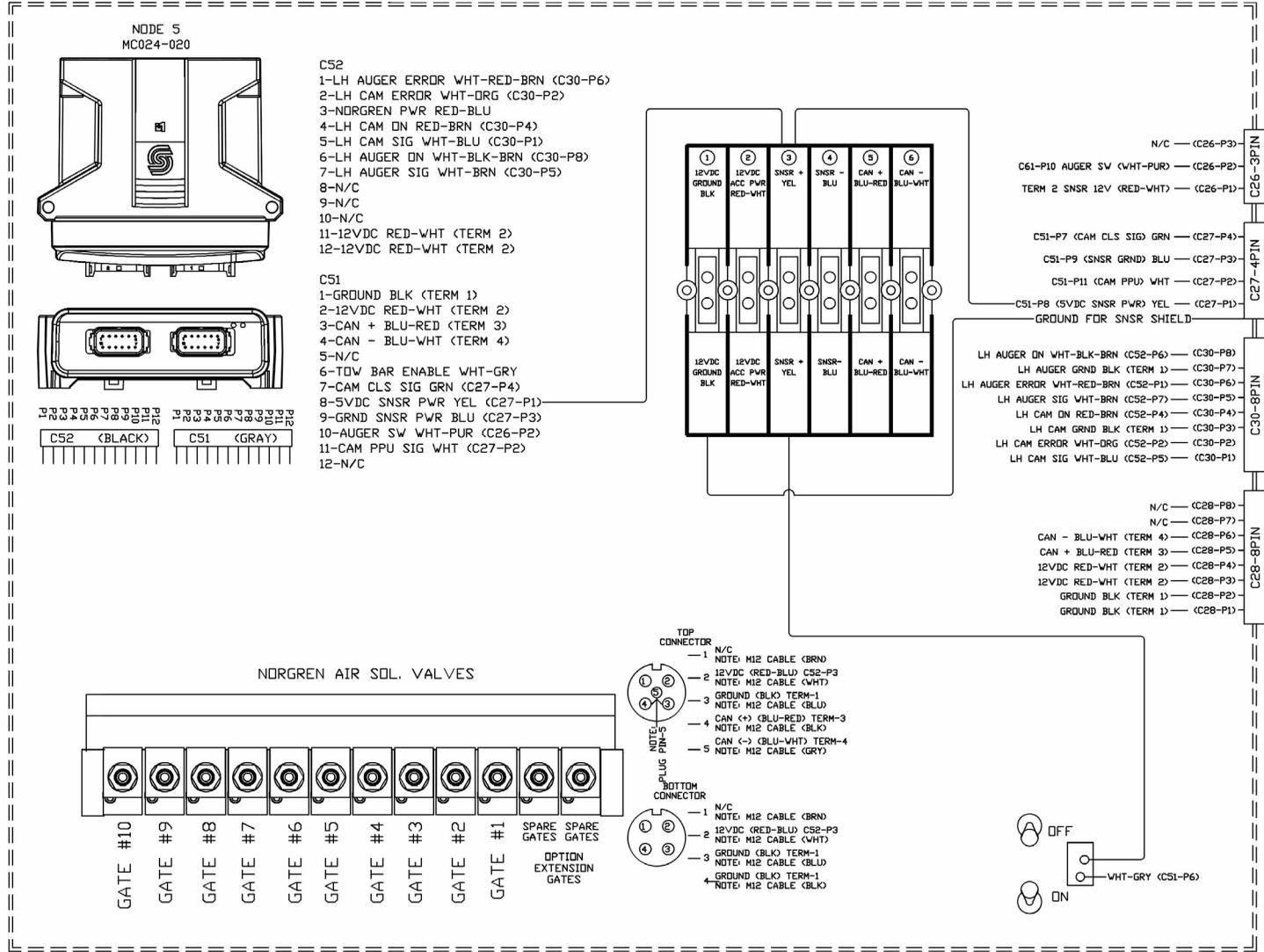
- PIN KEY NC-31**
- 1-GRND (BLU) GRND LUD
 - 2-RET-WHT (12V+) TERM 3
 - 3-BLU-RED (CAN+) TERM 6
 - 4-BLU-WHT (CAN- TERM 7)
 - 5-RED-BRN (CS-P2)
 - 6-BRN-YEL (CS-P17)
 - 7-WHT-BRN-YEL STATION SHIFT LEFT (CS-P27)
 - 8-YEL (CSNR SV+ TERM 4)
 - 9-BLU (CSNR GRND TERM 5)
 - 10-WHT-BLK-RED CRUISE RESUME/INC (CS-P28)
 - 11-WHT-BRN PARKING BRAKE SIG (CS-P18)
 - 12-WHT-BRN PARKING BRAKE SIG (CS-P18)
 - 13-WHT-GRN-BLU VEHICLE DIRECTION (C7-P9)
 - 14-WHT-BLK-PUR TCASE LOW SV (C7-P17)
 - 15-WHT-BLK-BLU CRUISE SET/DECEL (CS-P21)
 - 16-WHT-BRN-GRN STATION SHIFT RIGHT (CS-P28)
 - 17-RED-YEL TCASE LOW (CAN) (CS-P10)
 - 18-WHT-BRN-GRY PMP TEMP SNSR (C7-P5)
 - 19-GRN-BLK BRAKE SV (TERM 12)
 - 20-BLU-YEL 1939 + (TERM 8)
 - 21-BLU-BLK 1939 + (TERM 9)
 - 22-RED-BRN TCASE HI SV (CAN) (CS-P9)
 - 23-GRN-WHT ENGINE SPEED (C7-P4)
 - 24-WHT-GRN HYD FLUID LEVEL (C7-P7)
 - 25-WHT-YEL MAX SPEED CNT (CS-P25)
- PIN KEY NC-31**
- 26-WHT-GRN-RED FPM (C7-P11)
 - 27-WHT-BRN-YEL INTERCOOLER TEMP (C10-P1)
 - 28-NC
 - 29-BRN-YEL AIR PRESS (C7-P20)
 - 30-GRN-RED HYD TEMP (C10-P3)
 - 31-WHT-RED-YEL BACK UP ALARM (CS-P6)
 - 32-RED-BLK WARNING BUZZER (CS-P4)
 - 33-WHT-RED-BLU SHIFT SOL 1 (CS-P1)
 - 34-WHT-RED-BRN SHIFT SOL 2 (CS-P2)
 - 35-WHT-RED-GRN SHIFT SOL 3 (CS-P3)
 - 36-WHT-RED-TRG SHIFT SOL 4 (CS-P4)
 - 37-BLK-YEL MAN REGEN (C11-P4)
 - 38-BLK-GRN REGEN INHIBIT (C11-P7)
 - 39-WHT-GRN-GRN CLUTCH/BRAKE (C11-P12)
 - 40-RED-BLK MOTOR CONTROL (C7-P14)
 - 41-RED-GRN EDC FORWARD (CS-P1)
 - 42-RED-WHT EDC REVERSE (CS-P2)
 - 43-WHT-BLK-BLU CRUISE SET/DECEL (C11-P9)
 - 44-NC
 - 45-NC
 - 46-WHT-BLK-RED CRUISE RESET/INC (C11-P12)
 - 47-RED-WHT (12V+) TERM 3
 - 48-RED-WHT (12V+) TERM 3
 - 49-RED-WHT (12V+) TERM 3
 - 50-RED-WHT (12V+) TERM 3



QTY	NEXT ASSY	MADE BY	BEARCAT
?	-----	APPROVED	
		MATERIAL	
		SEE PRINTED B.O.M.	
		FINISH	
		TITLE	SCHÉ JUNCTION BOX
		TIER	4 2015
		PART NO.	210313
		DATE	10-1-13
		AUTHOR	RH
		SCALE	NONE
		SHEET	OF



LH Valve Box 210180

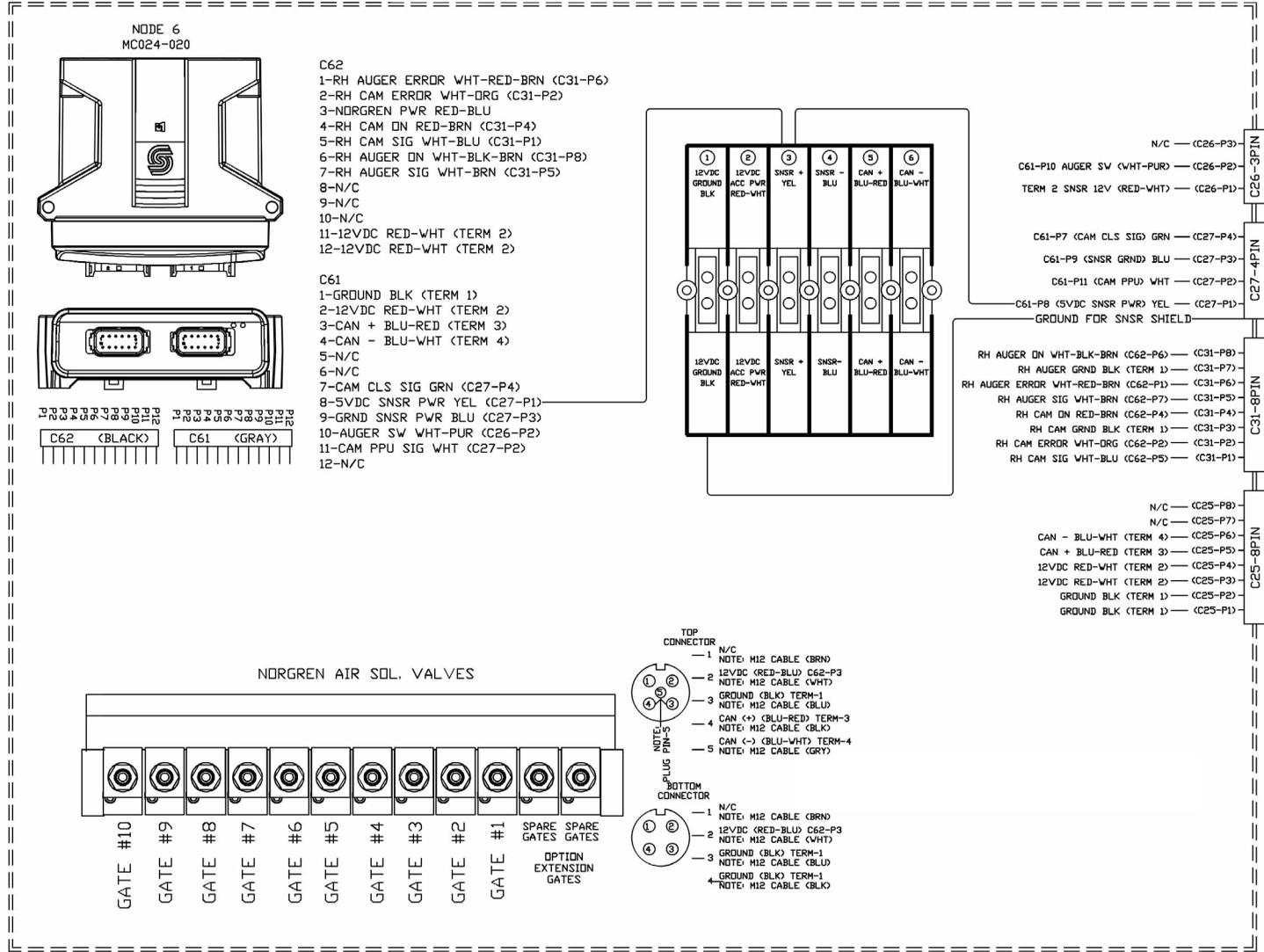


TO AUGER SW
TO CAM SNSR
TO CAM/AUGER VLVS
TO C13 SLAVE BOX

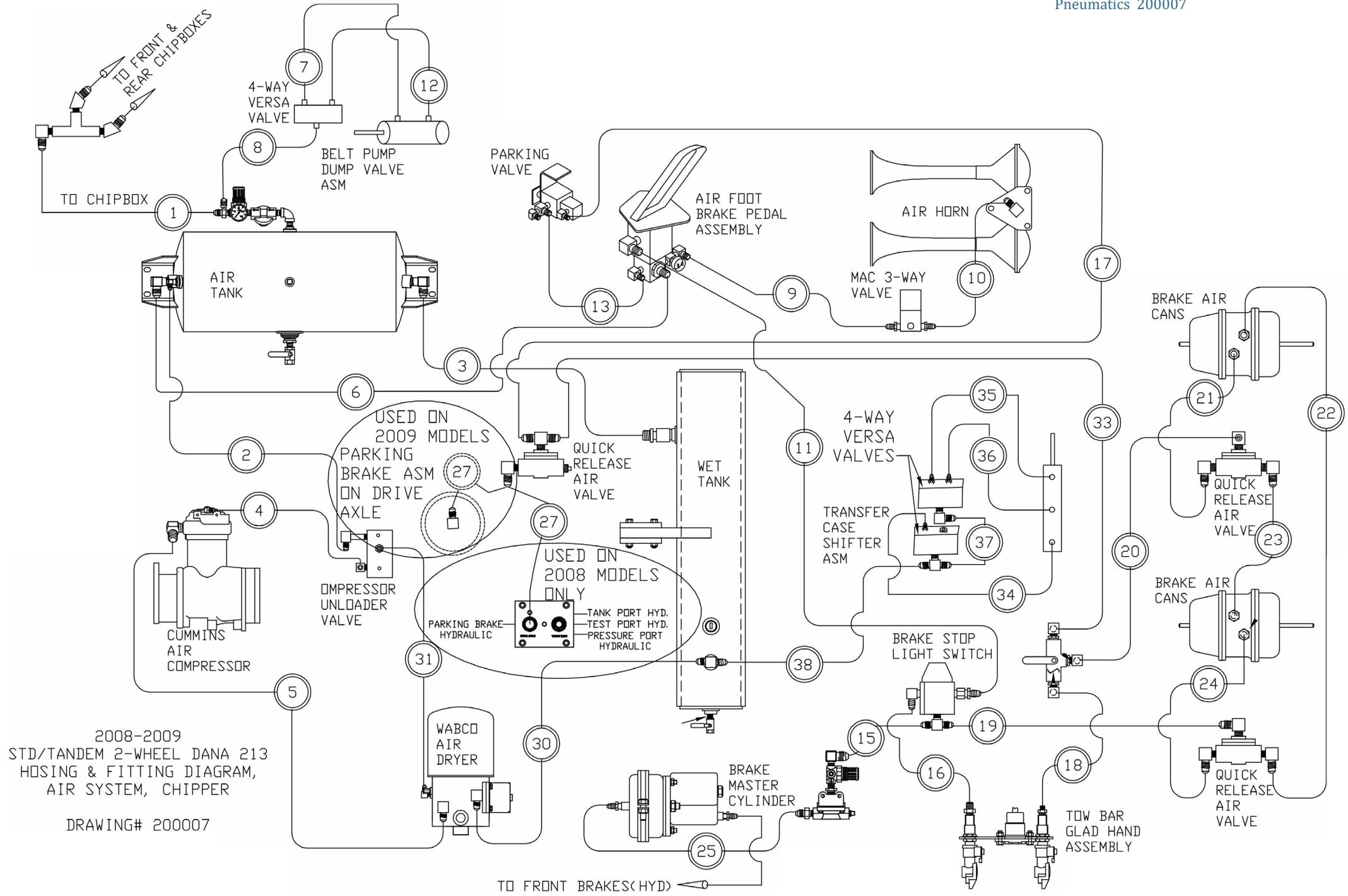
QTY	NEXT ASS'Y	MADE BY	BEARCAT	 <p>3650 SABIN BROWN RD. WICKENBURG, AZ 85390 BEARCAT MFG. (928) 684-7851</p>					
?--	?????????	APPROVED	MATERIAL						
	FINAL ASS'Y			TITLE					
?--	?????????	DRAWING NO.		SCHE CHIP 2015 TIER 4 LH VLV BOX					
				PART NO.					
				210180					
STANDARD	.X	.XX	.XXX XXXX	ANG.	X/X	AUTHOR	RH	DATE	7-25-13
TOLERANCE	+02	+010	+003 +0005	+1.0*	+1/32	SCALE	NONE	SHEET	1 OF 1



RH Valve Box 210181



QTY	NEXT ASS'Y	MADE BY BEARCAT	 3650 SABIN BROWN RD. WICKENBURG, AZ 85390 BEARCAT MFG. (928) 684-7851				
?- - - ? ? ? ? ? ? ? ?	APPROVED	MATERIAL					
FINAL ASS'Y	DRAWING NO.	TITLE					
?- - - ? ? ? ? ? ? ? ?	FINISH	PART NO.					
STANDARD TOLERANCE	.X +.02	.XX +.010	.XXX XXXX +.003 +.0005	ANG. X/X +1.0°	X/X +1/32	AUTHOR RH	DATE 7-25-13
						SCALE NONE	SHEET 1 OF 1



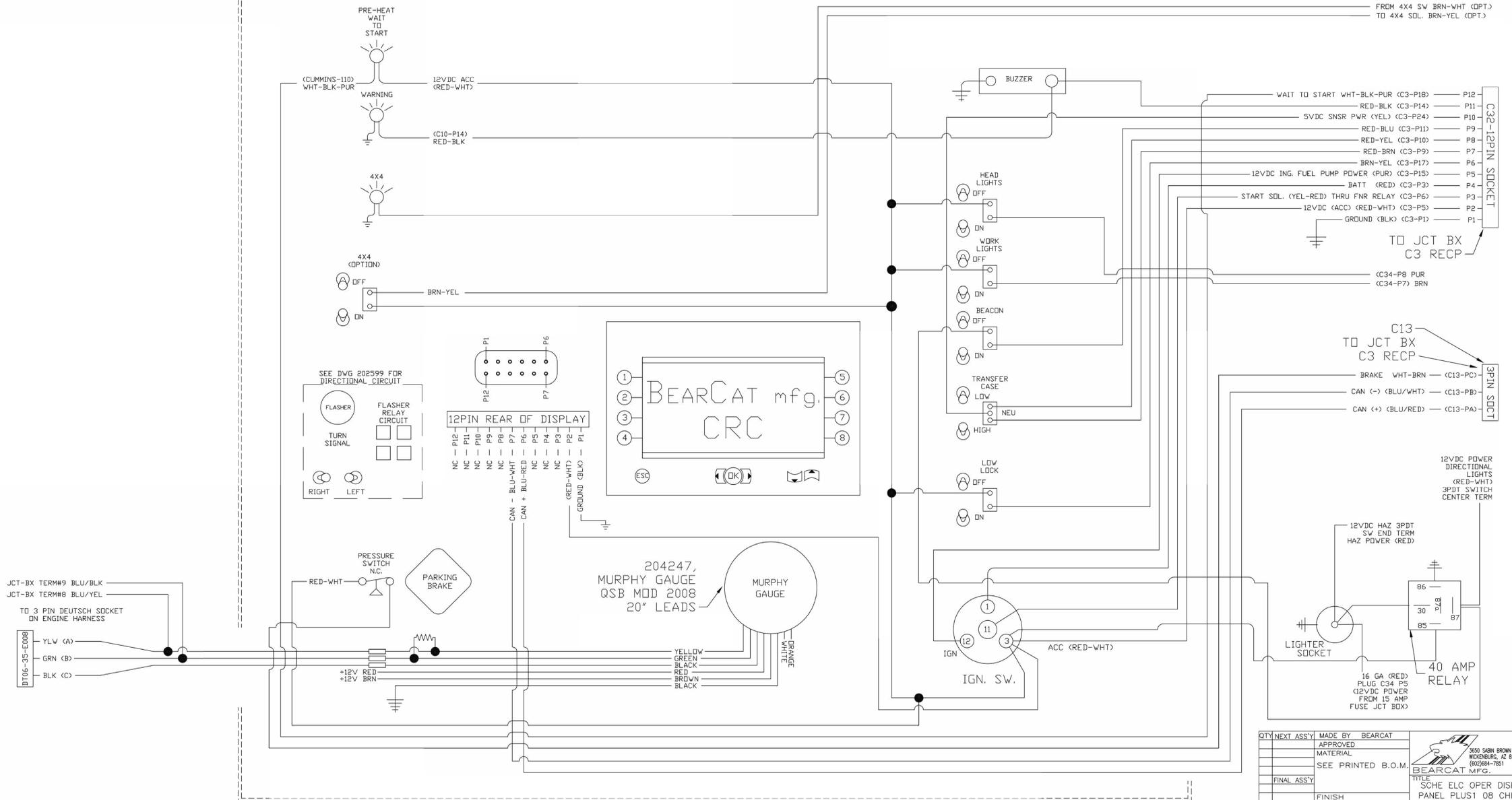
2008-2009
STD/TANDEM 2-WHEEL DANA 213
HOSEING & FITTING DIAGRAM,
AIR SYSTEM, CHIPPER

DRAWING# 200007



REV: 6-17-09 ADDED BRAKE PRESSURE SW & WIRES RTC
 REV: ADDED LIGHTER AND WIRING
 RICK/BM/FHK 6-1-11
 REV: ADDED BARRIER, 40 AMP RELY
 AND WIRING SEPARATE CIRCUIT
 BEACON, HAZ, LIGHTER
 RICK/FHK 7-13-11

INSTRUMENT PANEL



NOTE: 0.10 SYMBOL SCALE

QTY	NEXT ASS'Y	MADE BY	BEARCAT
		APPROVED	
		MATERIAL	
		SEE PRINTED B.O.M.	
		FINISH	
		TITLE	SCHE ELC OPER DISP
		PART NO.	202540
STANDARD	X XX XXXXXXX	ANG	X/X
TOLERANCE	+ .03 1.0151-0.0051-0.0005	F.T.	1/1/32
		AUTHOR	RTC/JDC
		DATE	11/14/07
		SCALE	NONE
		SHEET	OF

NODE 3 JUNCTION BOX

- Fpm Sensor
- Rpm (Tachometer)
- Vehicle Direction
- Transfer Case High/Low
- Fuel Level Sensor
- Air Pressure Sensor
- Brake Switch
- Hydraulic Temp Sensor
- Low Lock
- Max Speed Pot
- Stall Pot
- Edc Control
- Cruise Control
- Foot Pedal Sensor

NODE 4 SLAVE BOX

- Box Width (String Pots)
- Belt Speed (Ultrasonic Sensors)
- Hydraulic Oil Low Sensor
- Auger Hydraulic Control
- Belt Hydraulic Control
- Box Hydraulic Control
- Dump Valve
- Vibrators (If Equipped)

NODE 5 LH VALVE BOX

- LH Cam Position Sensor
- LH Cam Hydraulic Control
- LH Auger Switch
- LH Auger Hydraulic Control
- LH Norgren Valve Bank Power

NODE 6 RH VALVE BOX

- RH Cam Position Sensor
- RH Cam Hydraulic Control
- RH Auger Switch
- RH Auger Hydraulic Control
- RH Norgren Valve Bank Power

NODE 8 DASH PANEL

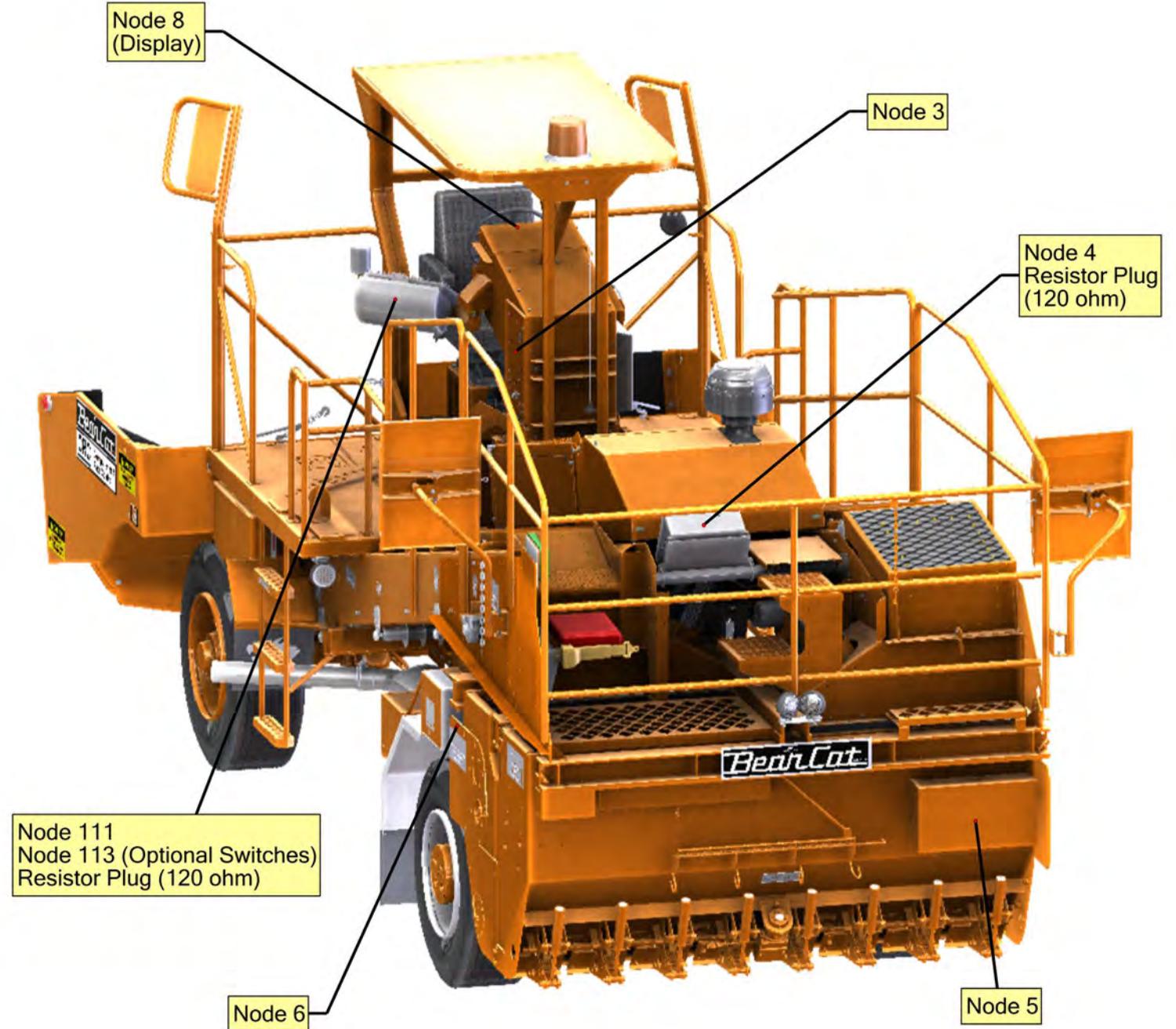
Displays info from other nodes

NODE 111 OPERATOR CONTROL

Reads switches that control machine

NODE 113 OPERATOR CONTROL

Reads optional gate switches



Node 8
(Display)

Node 3

Node 4
Resistor Plug
(120 ohm)

Node 111
Node 113 (Optional Switches)
Resistor Plug (120 ohm)

Node 6

Node 5