Header or attachment height system - Personal safety

⚠ DANGER

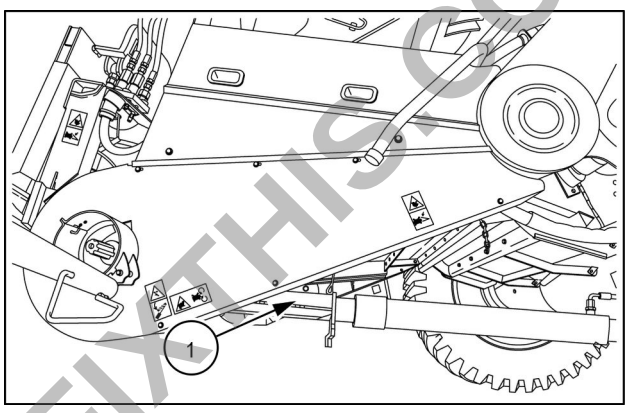
Crushing hazard!
Always do the following before you enter the area below the header and/or feeder:
- **Disengage the threshing mechanism.**
- **Lift the header to its maximum height.**
- **Apply the parking brake.**
- **Stop the engine.**
- **Place the lift cylinder lockout over the cylinder rod.**

Failure to comply will result in death or serious injury.

D0158B

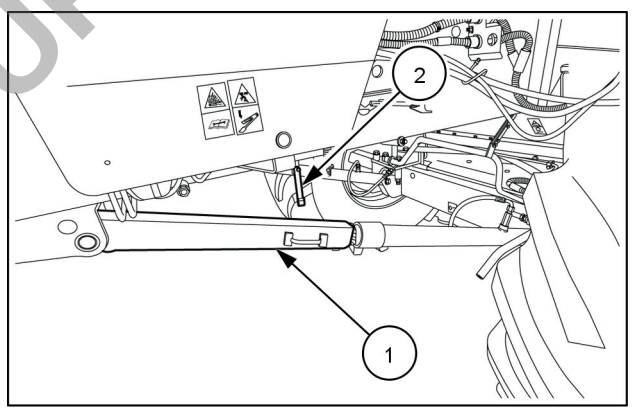
The left-hand cylinder is fitted with a lift cylinder lockout which must be lowered onto the cylinder rod to prevent accidental lowering of the header/feeder.

Whenever work is carried out underneath the header/feeder, the lockout must be lowered onto the cylinder rod as shown at **(1)**.



ZEIL14CR00308AA 1

Engage the lift cylinder lockout **(1)** by unhooking the lift cylinder lockout **(1)** from the hook **(2)** as shown.

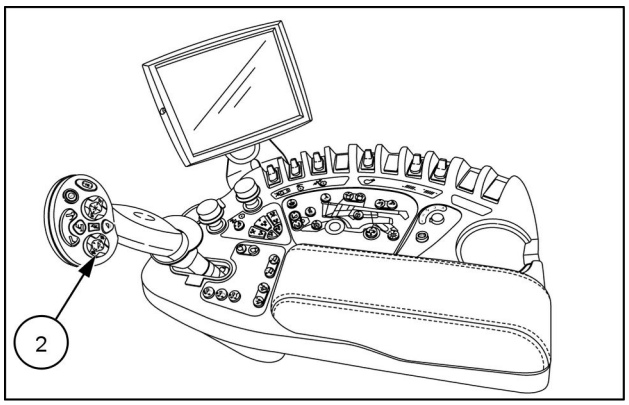


ZEIL13II00122AB 2

To engage or disengage the lift cylinder lockout it is necessary to lift the feeder to its maximum height.

1. Select field mode using the field/road mode selector switch.
2. Move the feeder up by pressing on the top of the header height rocker switch **(2)** on the multifunction handle until the header stops near its maximum height.
3. Release the switch and press again for a minimum of **1.5 s**. The header will now move quickly until its maximum height.

   NOTICE: *Make sure you lower the reel on grain headers BEFORE raising the header/feeder all the way to it's maximum height.*
4. Place the lift cylinder lockout over the cylinder rod.



ZEIL14CR00105AA 3

NOTICE: *Never use lift cylinder lockout **(1)** as a support for the header when travelling along public roads otherwise damage may occur to the cylinder.*

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Engine - Service instruction Grain tank access to engine

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

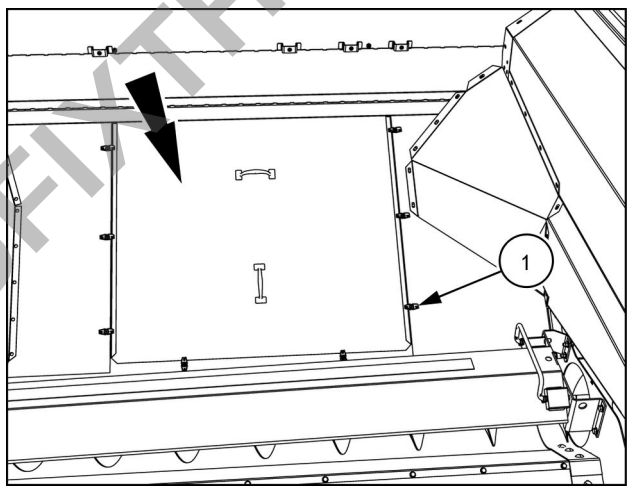
⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. Disengage all drives.
2. Engage parking brake.
3. Lower all attachments to the ground, or raise and engage all safety locks.
4. Shut off engine.
5. Remove key from key switch.
6. Switch off battery key, if installed.
7. Wait for all machine movement to stop.
Failure to comply could result in death or serious injury.

W0047A

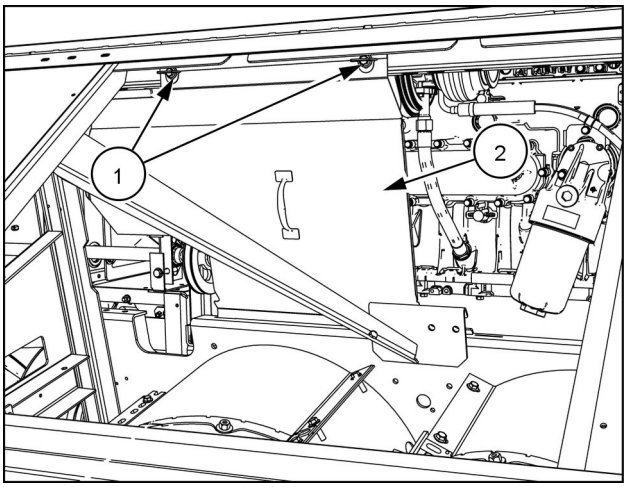
NOTE: *Some components have been removed for better clarity.*

1. To access the front of the engine, you will have to enter through the grain tank door. Turn the locking fasteners **(1)** to remove the door. Place in a safe place out of the way.



NHIL13CR00479AA 1

2. Turn the locking fasteners **(1)** securing the shields **(2)** to the frame. Remove the two shields (left hand side shown removed). Place in a safe place out of the way.



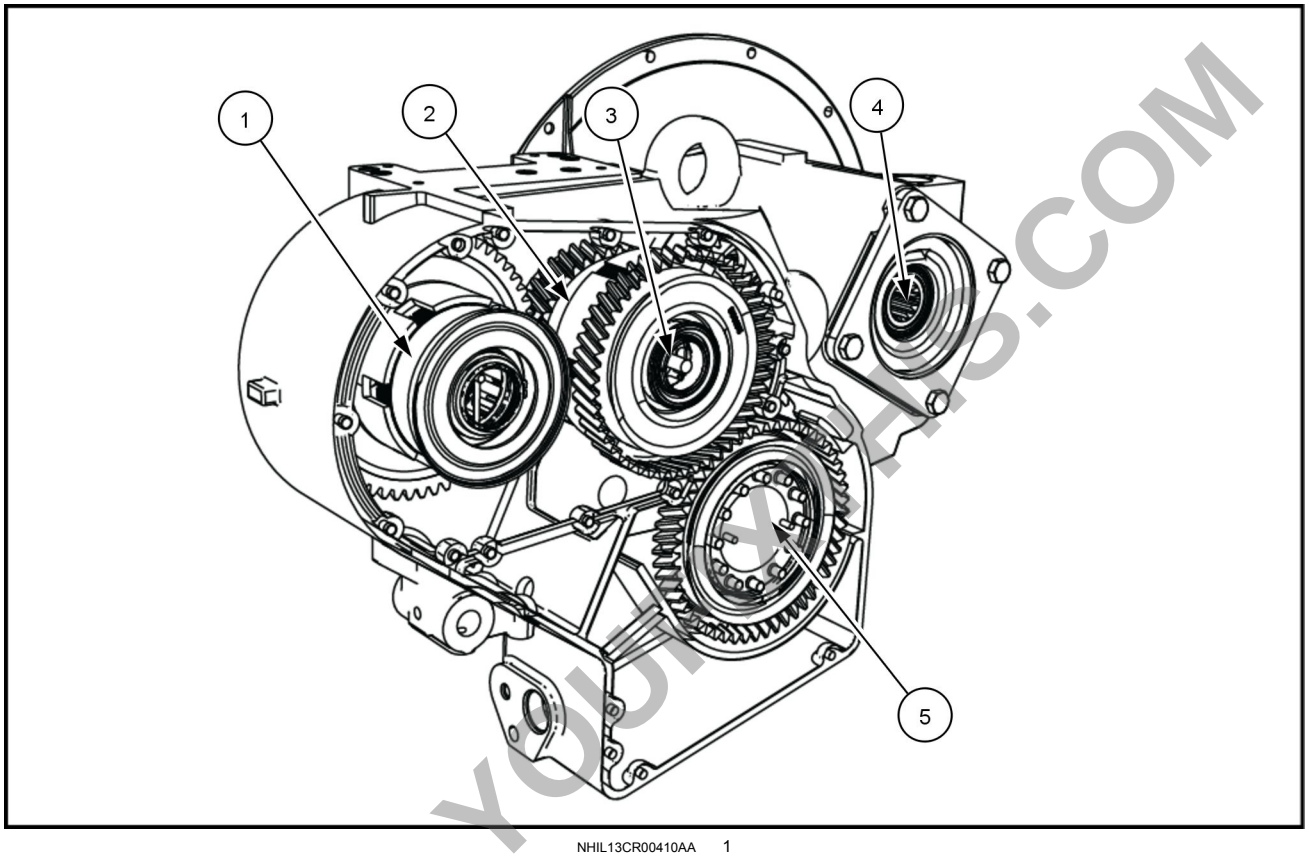
NHIL13CR00472BB 2

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Main gearbox and drive - Static description - Theory of operation

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA



NHIL13CR00410AA 1

Cut-away view

Unloading clutch and drive **(1)**

- Pressure oil coming from the valve block enters the shaft through a ring connector.
  The oil leaves the shaft behind the clutch plunger to engage the clutch.
- Lubrication oil enters the shaft from the end.
  The oil escapes through orifice ports to lubricate the clutch and hydraulic pump splines.
  From there, the oil flows to the bearings.
- When the clutch is disengaged, only limited lubrication can enter the clutch beyond the plunger.
  This prevents the clutch from dragging with cold oil.

Threshing clutch **(2)** and threshing drive **(5)**

- Pressure oil coming from the valve block enters the shaft through a ring connector.
  The oil leaves the shaft behind the clutch plunger to engage the clutch.
- Lubrication oil enters the shaft from the end.
  The oil escapes through orifice ports to lubricate the clutch and hydraulic pump splines.
  From there, the oil flows to the bearings.

High pressure (CCLS) output **(3)**

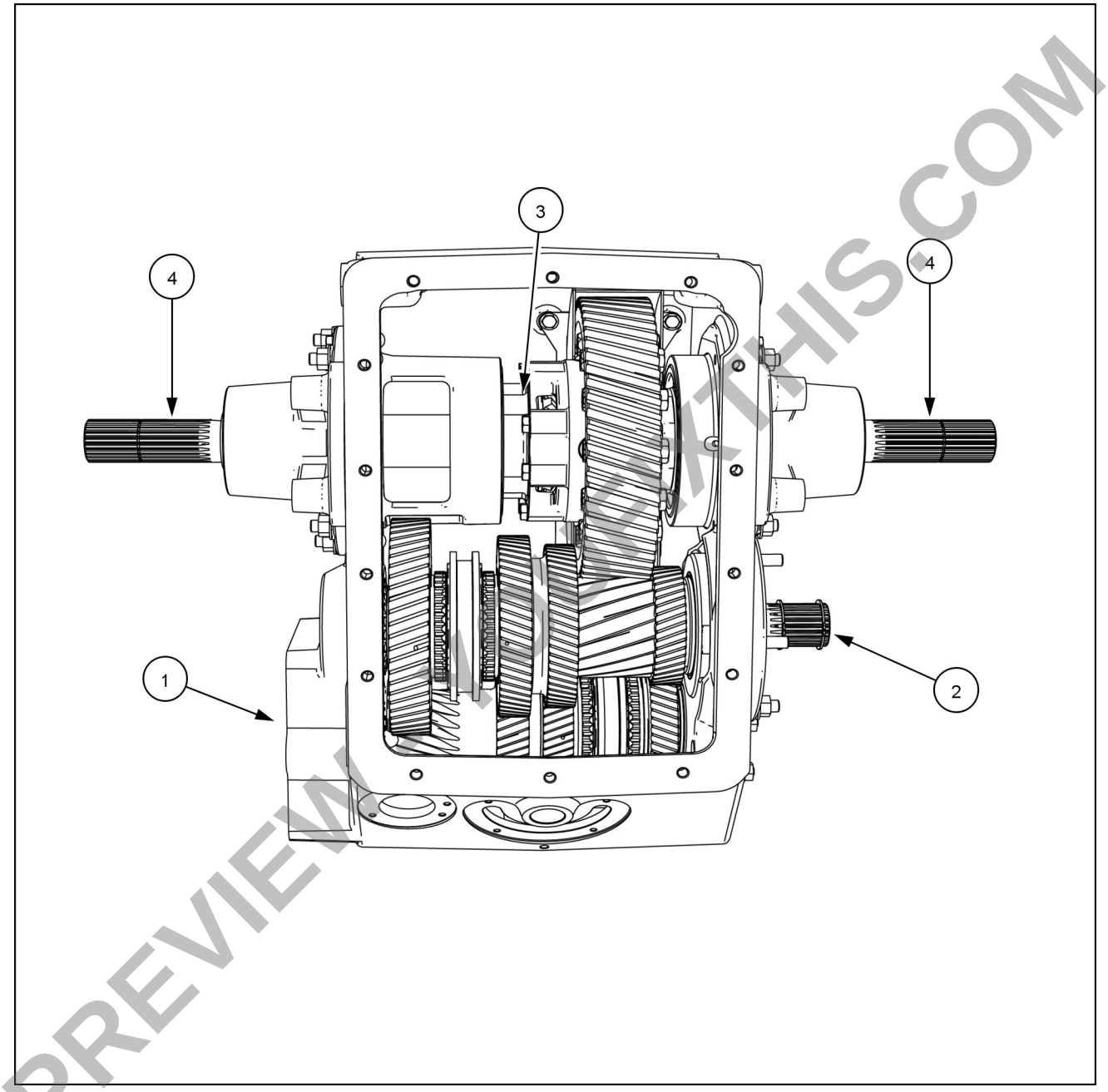
- Variable displacement CCLS piston pump powered here.
- Hydraulic pressure from CCLS operates:
  Steering, header raise and lower, rotor variator, feeder variator (optional), unloading auger swing, header reverser, lateral float, reel up and down, reel fore/aft, reel drive forward, reel drive reverse, and Advanced Stone Protection (ASP) cylinder (optional).

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Mechanical transmission - Sectional view

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA



NHIL13CR00553FA 1

GEARBOX SHAFTS (Sectional View)

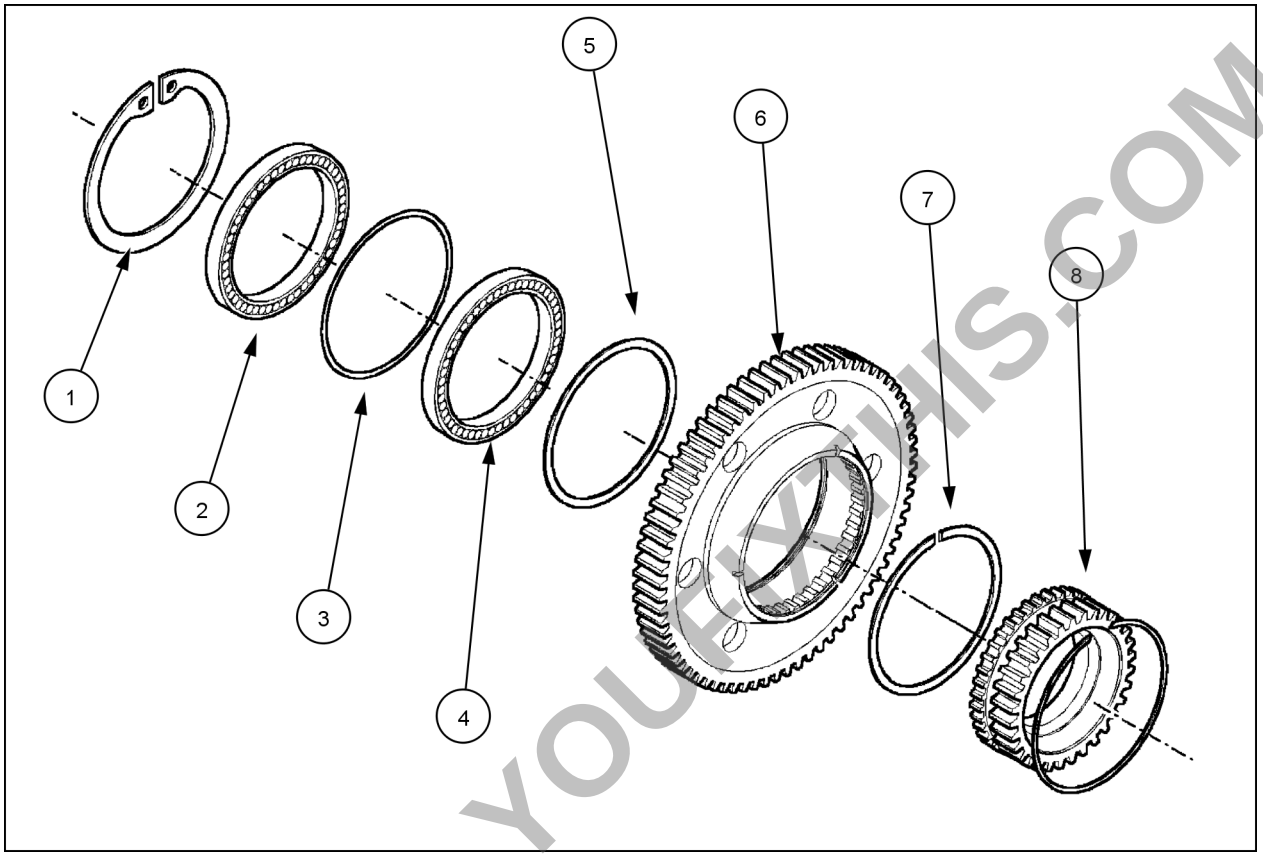
(1) Input shaft
(2) Drive shaft
(3) Differential
(4) Differential shafts

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Final drive - Exploded view

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA



63060023 1

1. Retaining Ring
2. Bearing, Ball
3. Shim Spacer
4. Bearing, Ball
5. Spacer Ring
6. Reducer Spur Gear
7. Retaining Ring
8. Sun Gear

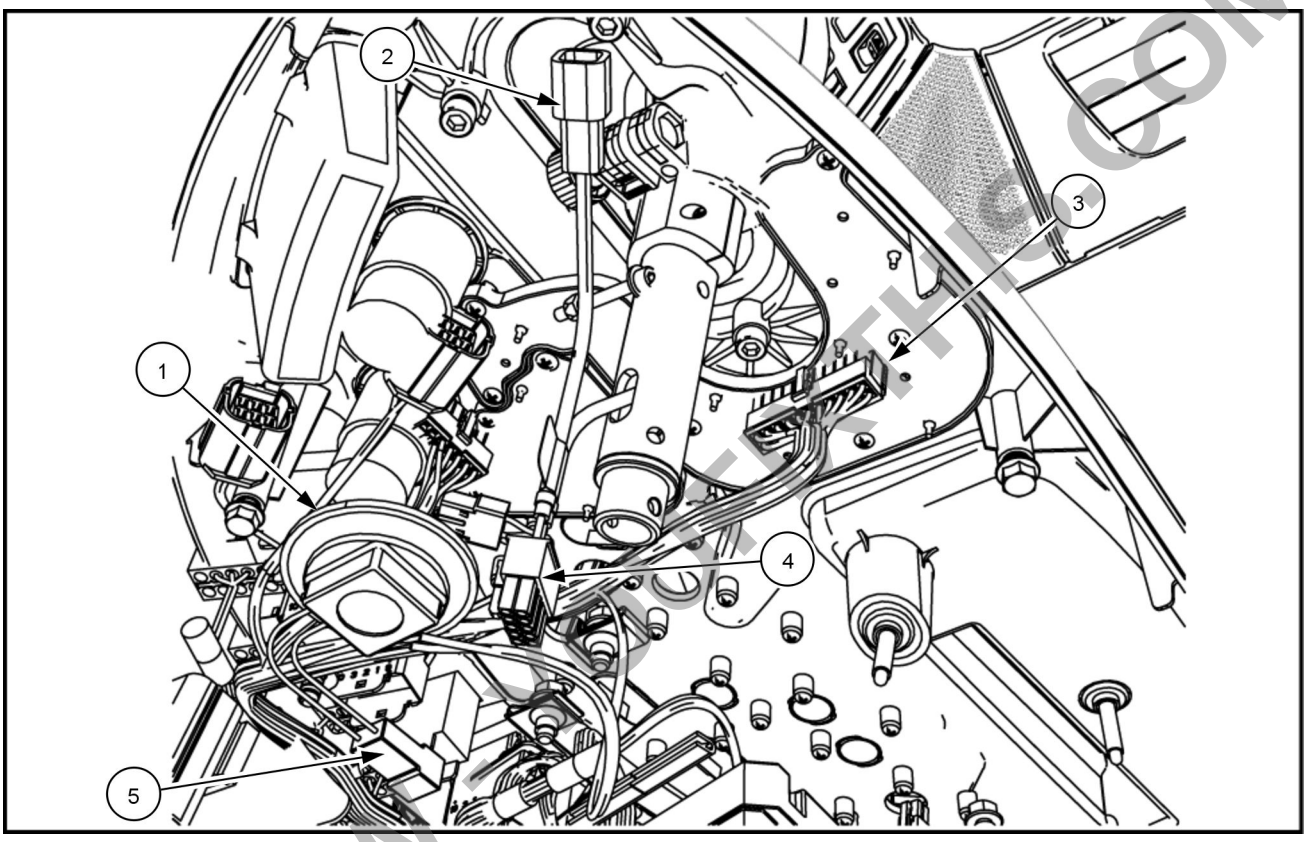
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Transmission and steering hydrostatic control - Component localization - Right-hand Console - Hydrostat Control

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

Hydrostat Control Components



NHIL15CR00369AA 1

1. Audio alarm speaker
2. Connector A to **CommandGrip™**
3. Connector to **CommandGrip™** ICP
4. Connector B to **CommandGrip™**
5. Connector to audio alarm speaker

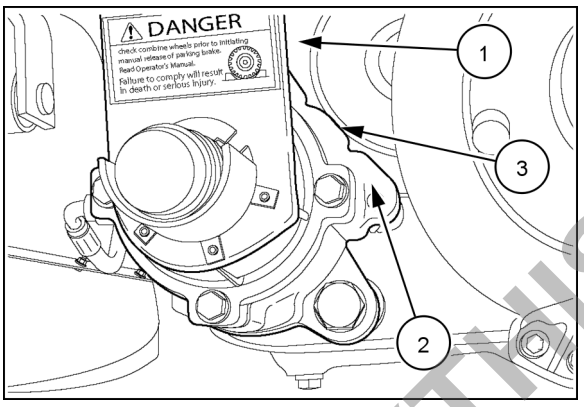
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Parking brake or parking lock - Dynamic description

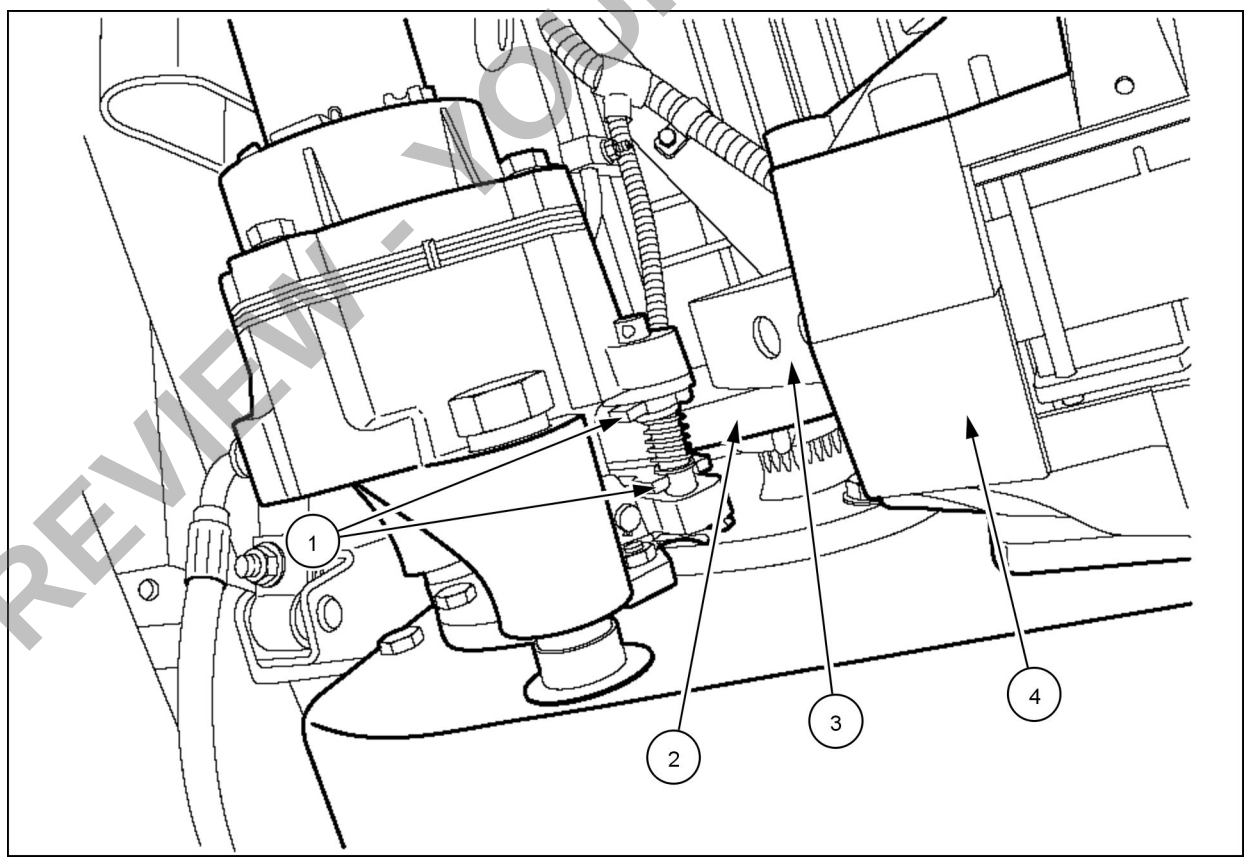
CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

The park brake keeps the combine from moving by clamping a brake disc **(1)** on the transmission drive shaft. The park brake caliper **(2)** grips the disc at point **(3)**.



83080178 1

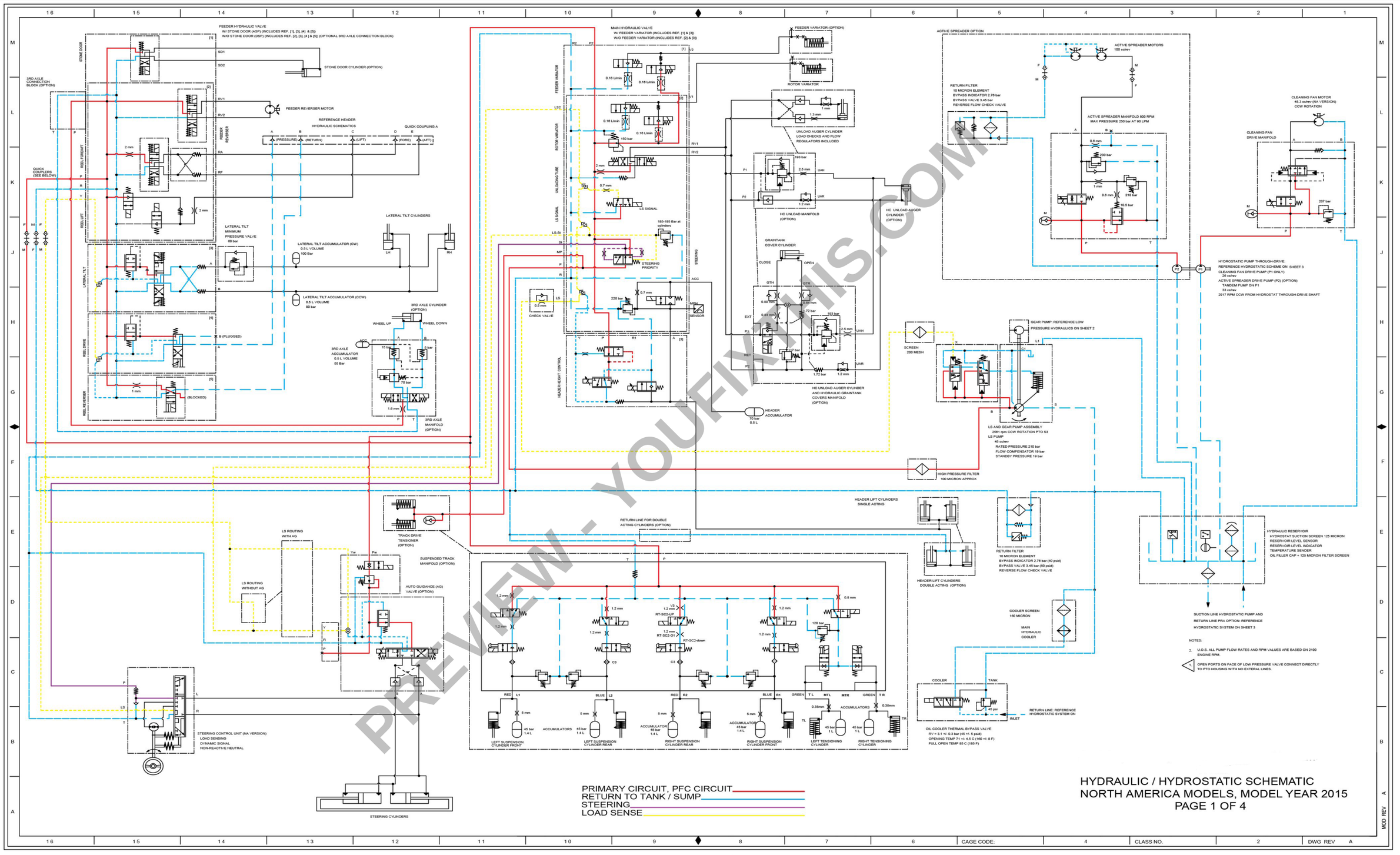
Figure **2**, a view from underneath the transmission looking upward, shows the caliper forks **(1)** gripping the drive shaft brake disc **(2)**. A brake pad is on the gripping face of each fork. Also shown is a service brake disc **(3)** and its lower caliper assembly **(4)**. The service brake discs are on the differential shafts, which transmit motion from the differential, contained within the transmission gearbox, to the wheel assemblies.



83080175 2

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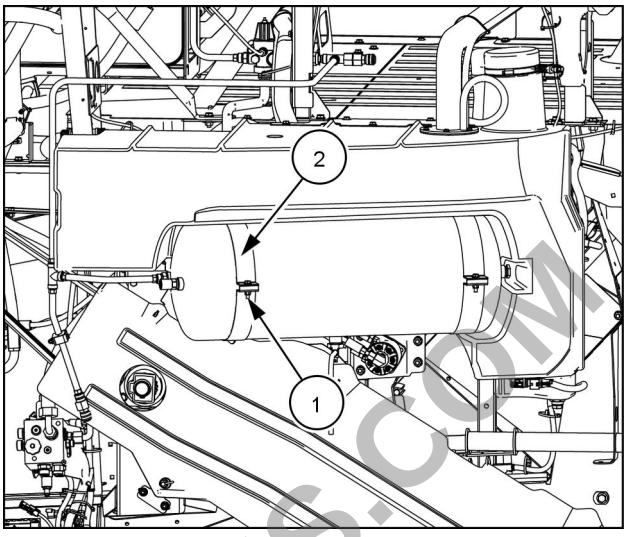
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3. Remove the hardware **(1)** from each support strap **(2)**.



NHIL14CR00237AA 3

4. **⚠ DANGER**

   Heavy objects!
   Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
   Failure to comply will result in death or serious injury.

   D0076A

   Open the support straps and remove the air compressor tank from the combine using a pair of lifting straps rated to lift over **68.2 kg** (**150.4 lb**)

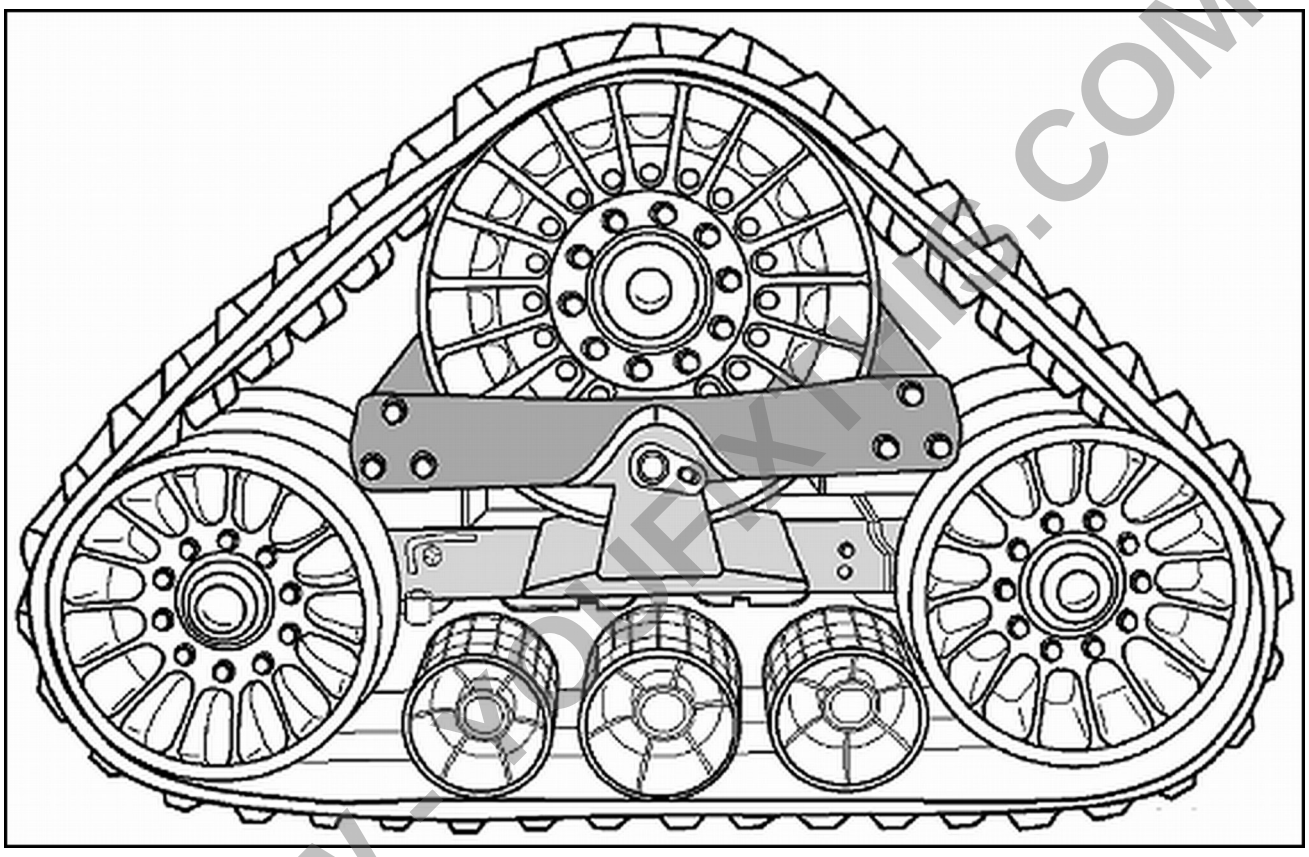
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Tracks - Component identification

CR6.80	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

The undercarriage components are the same basic components as used on the STX tractors with the exception of the Main Mounting Frame, which is unique to the combine.



NHIL13AF01914AA 1

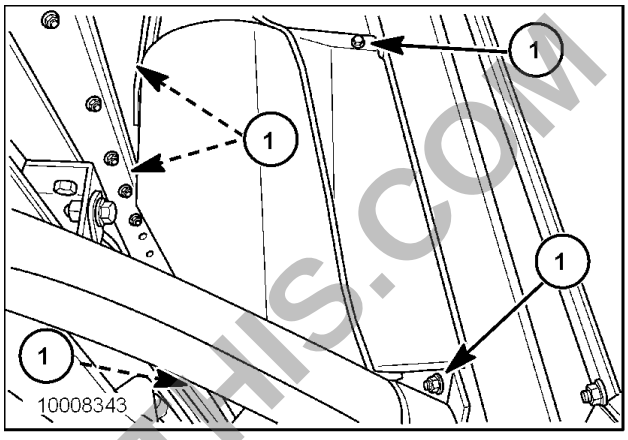
Undercarriage

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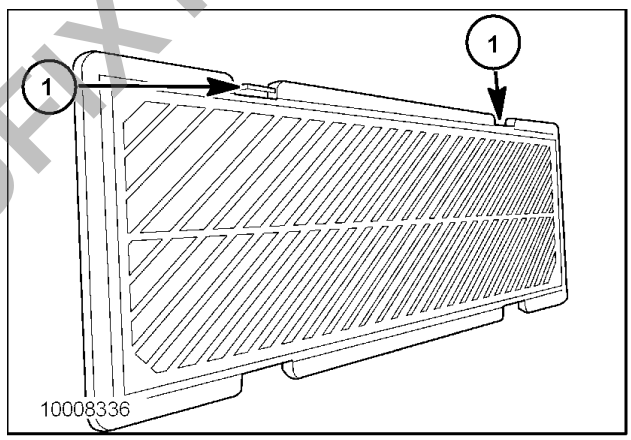
Heater core - Remove

1. It is possible to completely remove the heater core from the ventilation housing without removing the coolant and lines. If the heater core is to be removed from the combine, shut the heater core supply **(1)** and return **(2)** valves located at the engine.
2. Remove five cap screws **(1)** holding the ventilation system shield in place. Lift shield from combine.



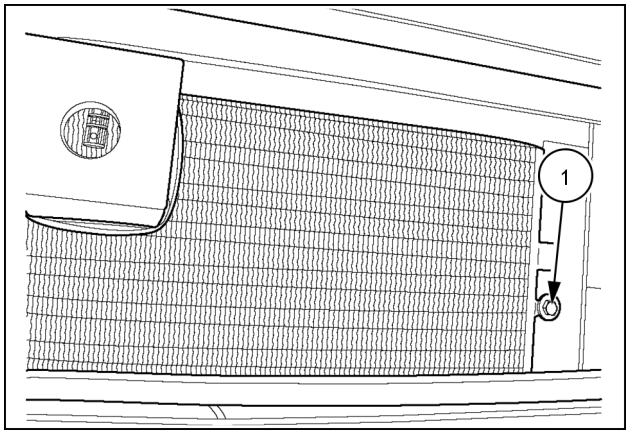
10008343_1067 1

3. Simultaneously push down while pulling out on locking tabs **(1)**. A prying device may have to be used. Pull grate and filter from cavity.



10008336_1068 2

4. Remove mounting cap screw **(1)**.



83082263 3

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Electrical system - Dynamic description Theory of operation – H-bridge circuit

All the devices included in the H-bridge circuit

- Control module
- Internal switches or relays
- Motors (or load)

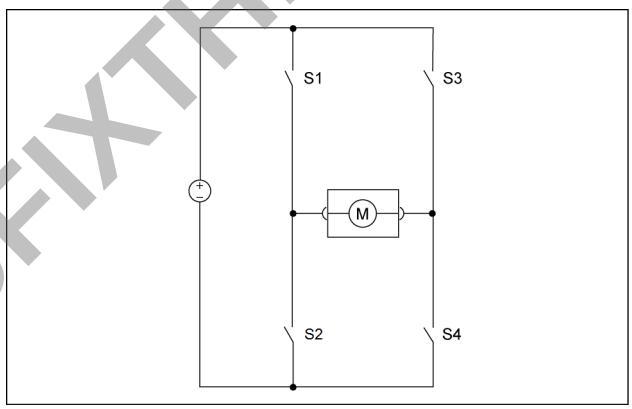
Operation description

A H-bridge is an electronic circuit that enables a voltage to be applied across a load in either direction. The term ‘H-bridge’ was derived from the “H” shape schematic configuration.

Typically, a control module cannot deliver enough voltage to spin a motor in the forward direction or the reverse direction, therefore H-bridges are used. They are also used by the control module to block sudden voltage spike that occur when the motor direction or speed is changed, from the control module control lines.

The basic operation of a H-bridge can be best explained as:

- two (normally open) parallel switches, S1 and S3. These switches are connected to the positive terminals of a voltage source.
- two (normally open) parallel switches, S2 and S4. These switches are connected to the negative terminals of a voltage source.



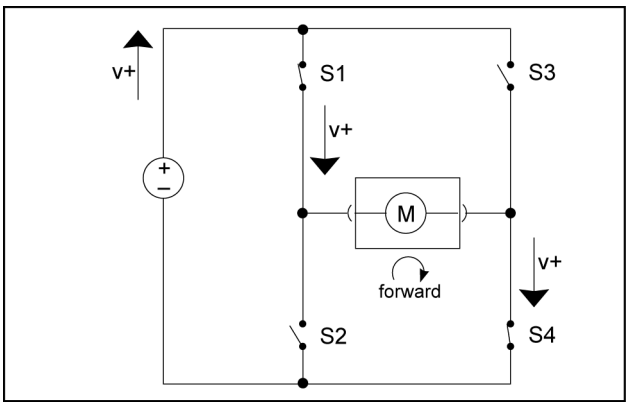
CIH13MRR(2) 1

The switches S1 and S3 are referenced as the “high side drivers”. The other side of the S1 is connected to the positive terminal of the motor (or load) and the other side of the S3 is connected to the negative terminal of the motor (or load). (see figure above)

The switches S2 and S4 are reference as the “low side drivers”. The other side of the S2 is connected to the positive terminal of the motor (or load) and the other side of the S4 is connected to the negative terminal of the motor (or load). (see figure above)

Forward direction

In order to spin the motor in the forward direction, switches S1 and S4 will close and create a closed loop causing positive voltage to flow across the motor.



NHIL13CR00605AA 2

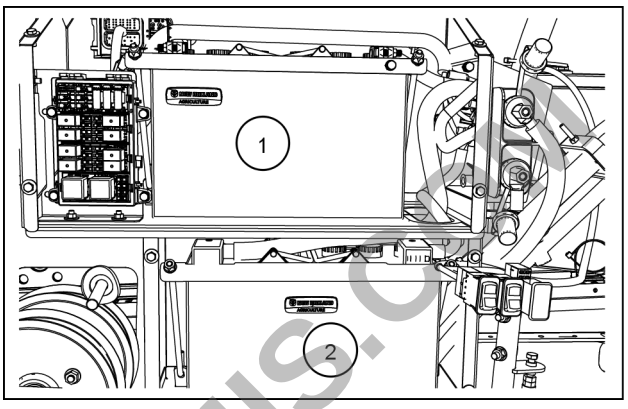
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Engine starting system - Dynamic description Theory of operation – Starting/Charging system

All the devices included in the starting and charging system

- Top battery **(1)**

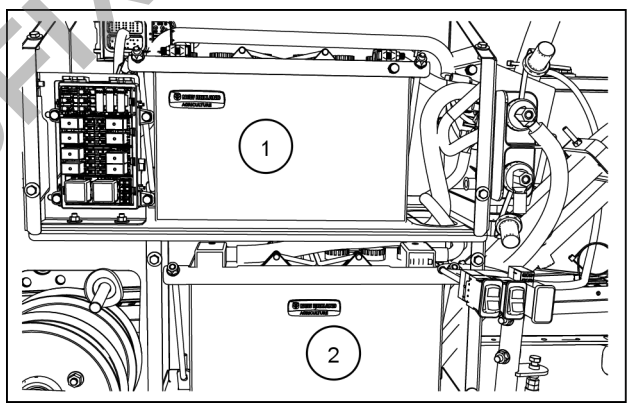


NHIL15CR00311AA 1

- Charged by the alternator.

- Provides power to the **12 V** the main combine electrical systems.

- Lower battery **(2)**

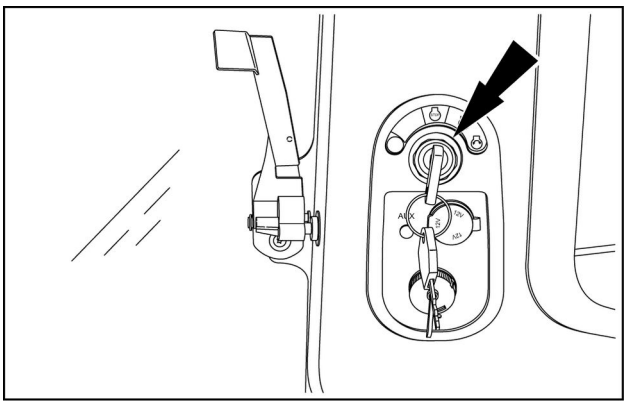


NHIL15CR00311AA 2

- Charged by the equalizer

- Provides power to the **24 V** electrical system, which consist of the starter circuit, H-bridge 3 circuitry, Cleaning circuit, Residue circuitry, and engine circuitry.

- Ignition switch



ZEIL14CR00059AA 3

- Battery disconnect switch

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Place the key switch in the ON position.

Use a multimeter to check for voltage:

From	To	Result
Graintank (GT) harness side of connector X-191 pin 2	Chassis ground	Should be approx. **8.2 V**

A. If the voltage reading is greater than **8.2 V**, continue to Step **5**.

B. If there is approx. **8.2 V**, continue to Step **4**.

4. Check for an open condition.

Place the key switch in the OFF position.

Use a multimeter to check for continuity:

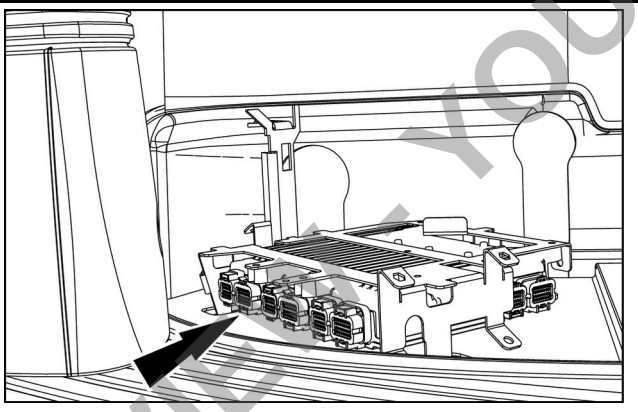
From	To	Result
Graintank (GT) harness side of connector X-191 pin 1	Chassis ground	Should be continuity

A. If there is continuity, continue to Step **5**.

B. If there is no continuity, there is an open condition between connector X-191 pin 1 and connector X-001C4A pin 20, wire 501 blue. Locate the open conductor. Repair the open conductor.

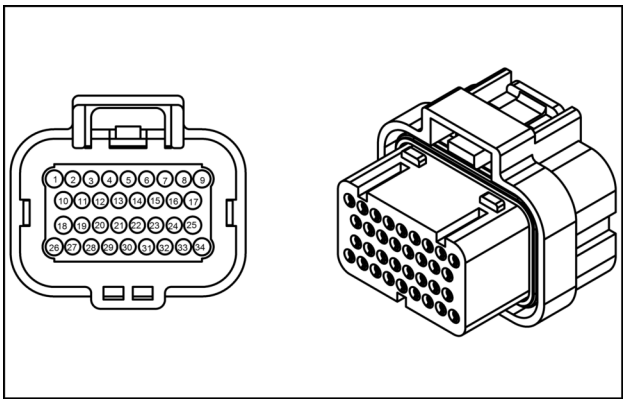
5. Check for a short to high condition.

Disconnect the CM harness from the module at connector X-001C1B.



NHIL13AF00020AA 3

Connector X-001C1B is located under the right hand console.



87410946 4

Connector X-001C1B.

Use a multimeter to check for voltage:

From	To	Result
UCM connector X-001C1B pin 16	Chassis ground	Should be approx. **8.2 V**

A. If the voltage reading is greater than **8.2 V**, the module has failed internally. Load the appropriate module software. If the fault re-occurs, replace the module.

B. If there is approx. **8.2 V**, there is a short to high condition between connector X-001C1B pin 16 and connector X-191 pin 2, wire 004 yellow. Locate the shorted conductor. Repair the shorted conductor.

6. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

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Use a multimeter to perform the following:

From	To	Result
Cab Platform Lower (CPL) harness side of connector X-107 pin A	Chassis ground	Should be approx. **5.0 V**
Cab Platform Lower (CPL) harness side of connector X-107 pin C	Chassis ground	Should be approx. **5.2 V**

A. If the voltage reading is correct, continue to Step **4**.

B. If the voltage reading is incorrect, continue to Step **5**.

4. Check the ground reference.

   Place the key switch in the OFF position.

   Use a multimeter to check for continuity.

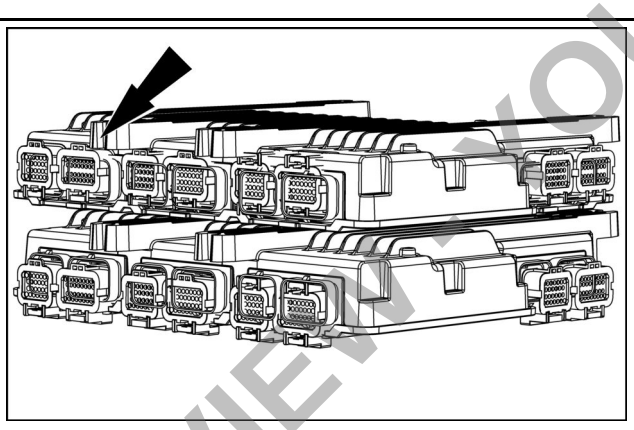
From	To	Result
Cab Platform Lower (CPL) harness side of connector X-107 pin B	Chassis ground	Should be continuity

A. If there is continuity, continue to Step **5**.

B. If there is no continuity, there is an open condition between connector X-107 pin B and connector X-002C1B pin 20, wire 511 blue.Locate the open conductor. Repair the open conductor.

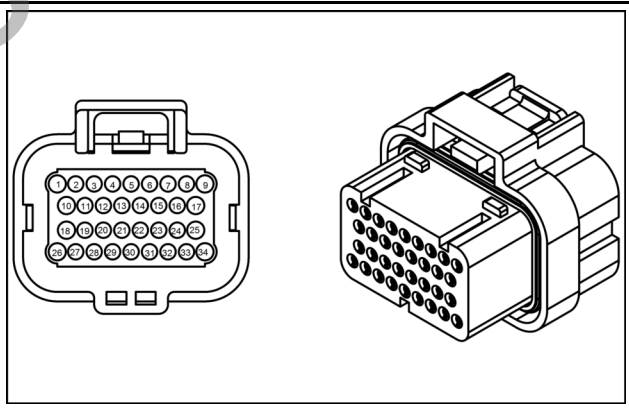
5. Place the key switch in the OFF position.

   Disconnect the Cab Main (CM) harness from UCM at connector X-002C1B.



NHIL13AF00378AA 3

Connector X-002C1B is located under the right hand console.



87410946 4

Connector X-002C1B.

Use a multimeter to check for continuity:

From	To	Result
Cab Platform Lower (CPL) harness side of connector X-107 pin A	Cab main (CM) harness at connector X-002C1A pin 9	Should be continuity
Cab Platform Lower (CPL) harness side of connector X-107 pin C	Cab main (CM) harness at connector X-002C1B pin 13	Should be continuity
Cab Platform Lower (CPL) harness side of connector X-107 pin A	Cab Platform Lower (CPL) harness side of connector X-107 pin C	Should be no continuity

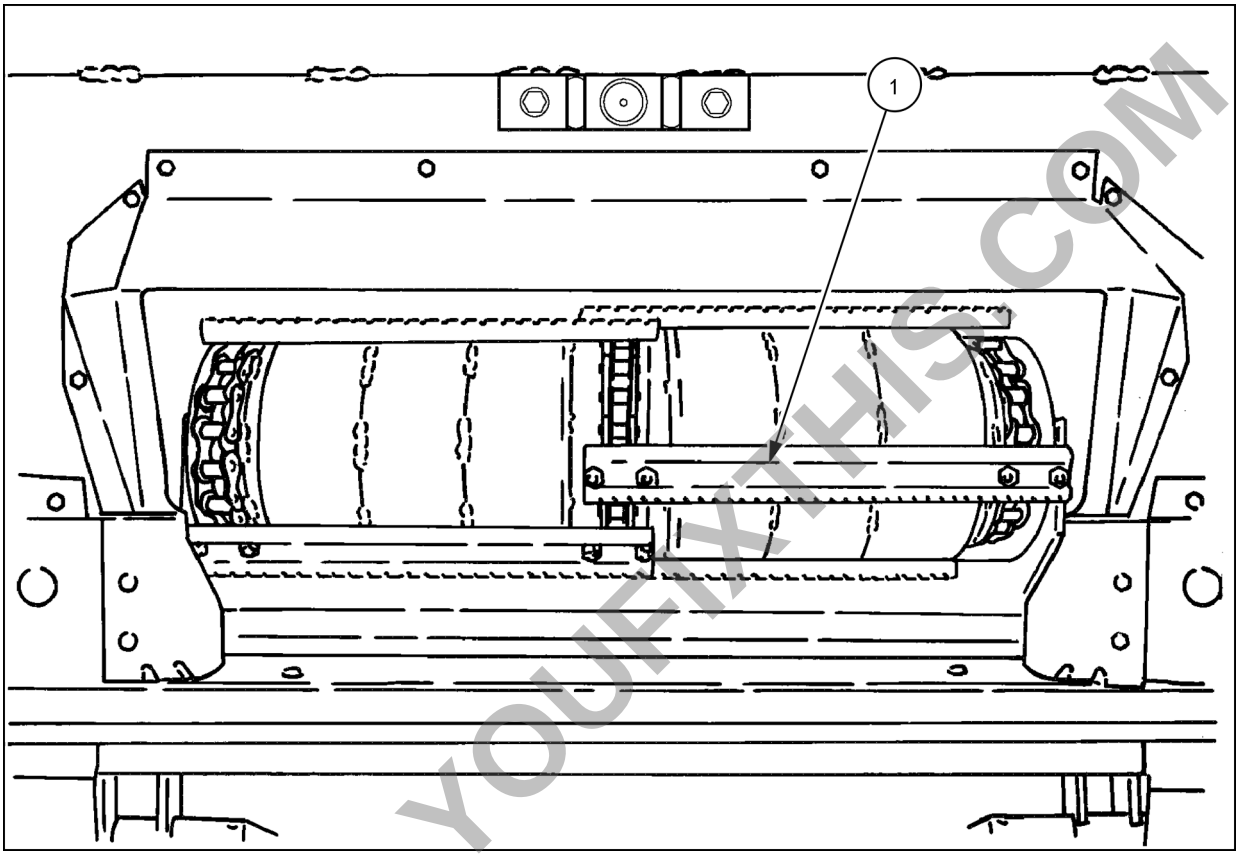
A. If the circuit test passes, the UCM1 has failed internally. Load the appropriate module software. If the fault re-occurs, replace the module.

B. If the circuit test fails, there is a faulty wire between connector X-002C1B pin 13 and connector X-107 pin C, wire 678 yellow. Locate the faulty wiring. Repair the faulty wiring.

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Feed chain Feeder housing - Overview

CR6.80	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA



56063458 1

The feeder chain (1) transports the incoming crop from the header, through the feeder house and to the rotors in the combine. The feeder chain is driven by the pivot shaft and loops around the front drum in the feeder house. If damaged or worn, the serrated slats on the feeder chain can be replaced without removing the chain.

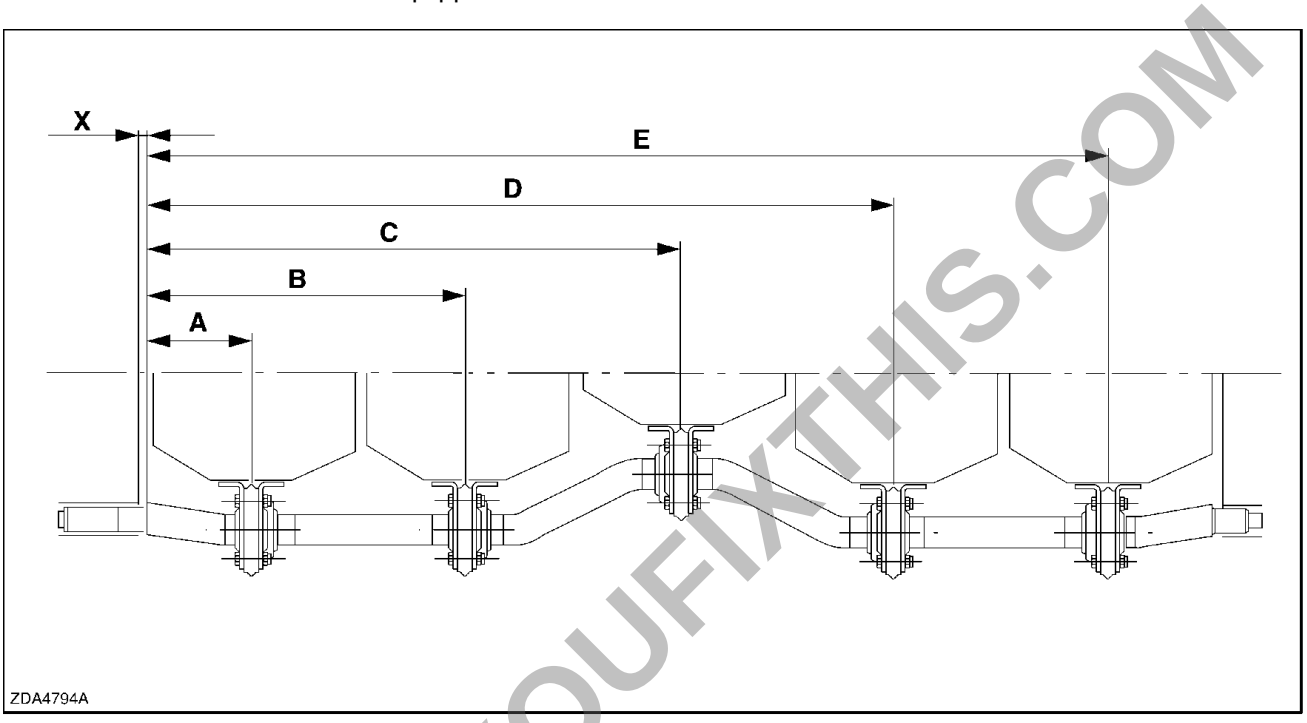
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Straw walkers and shafts - Dimension

CR6.80	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

NEW HOLLAND combine models equipped with 5 straw walkers.



ZDA4794A 1

A = **125 - 129 mm** (**4-59/64 - 5-5/64 in**)
B = **386 - 390 mm** (**15-3/16 - 15-11/32 in**)
C = **647 - 651 mm** (**25-15/32 - 25-5/8 in**)
D = **908 - 912 mm** (**35-3/4 - 35-29/32 in**)
E = **1169 - 1173 mm** (**46-3/128 - 46-3/16 in**)
X = **3 mm** (**1/8 in**)

Straw walkers and shafts - Dimension

CR6.80	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

NEW HOLLAND combine models equipped with six straw walkers

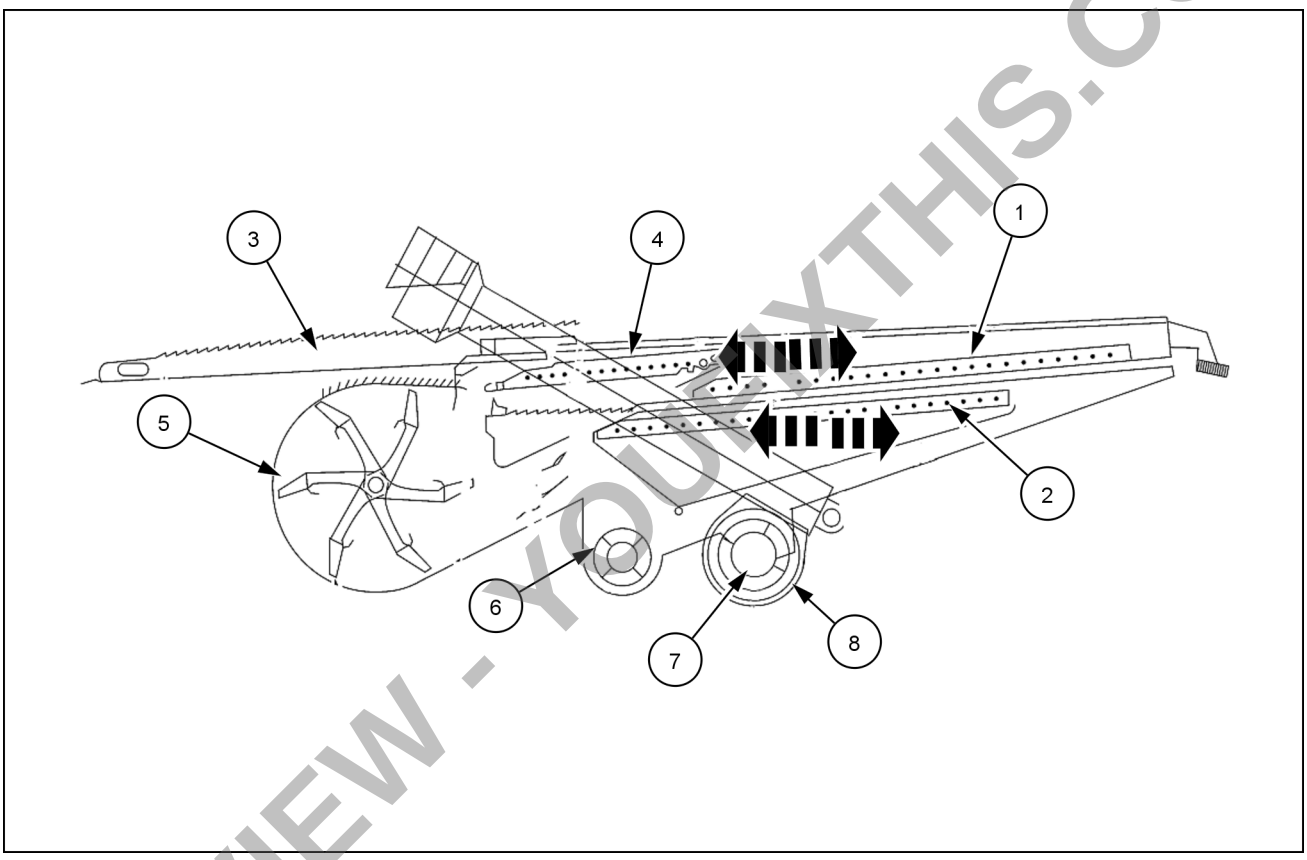
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Cleaning - Overview

CR6.80	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

The grain and chaff on the grain pan are transported to the rear by the reciprocating action of the cleaning shoe. An electrical actuator ensures that the cleaning shoe automatically remains horizontal in the transverse axis of the machine, even when operating on side slopes up to **13.7 %**. This innovation increases the capacity of the cleaning sieve considerably when operating in hilly conditions. See **Lateral inclination sensor - Overview (55.423)** and **Shaker shoe positioning electric actuator - Overview (55.780)** for more information concerning function of the self-leveling system.



20100393 1

The cleaning shoe is composed of an upper sieve **(1)** and a lower sieve **(2)** that move in opposite directions. A first separation takes place on the grain pan **(3)** as the lighter chaff forms the top layer and the heavier grain the bottom layer. The material falls through the finger grate installed at the rear of the grain pan, onto the pre-sieve **(4)**. The air coming from the secondary air duct of the cleaning fan **(5)** blows the chaff over the pre-sieve so that the grain, with a reasonably high degree of cleanliness, falls through the pre-sieve. This action will be repeated a second time between the pre-sieve and upper sieve.

The air coming from the main air duct of the cleaning fan blows the chaff over the upper sieve out of the machine, while the grain, un-threshed heads and small volumes of chaff, fall onto the lower sieve. In addition, the grain separated by the pre-sieve is guided by the small grain pan to the lower sieve.

The installation of a pre-sieve considerably increases the cleaning shoe capacity as the main separation of grain and chaff occurs at both finger grates. The lower sieve or cleaning sieve, provides the final cleaning operation. Grain that passes through the cleaning sieve is carried over the grain plate to the clean grain cross auger **(6)**. Un-threshed heads that do not fall through the lower sieve are transported by the returns auger **(7)** to the tailings processor **(8)** for re-threshing. The processor discharges the processed tailings on the upper sieve for cleaning.

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Engine hood and panels - Remove

CR6.80 TIER 4B	NA
CR6.90	NA
CR7.90	NA
CR8.90	NA
CR9.90	NA

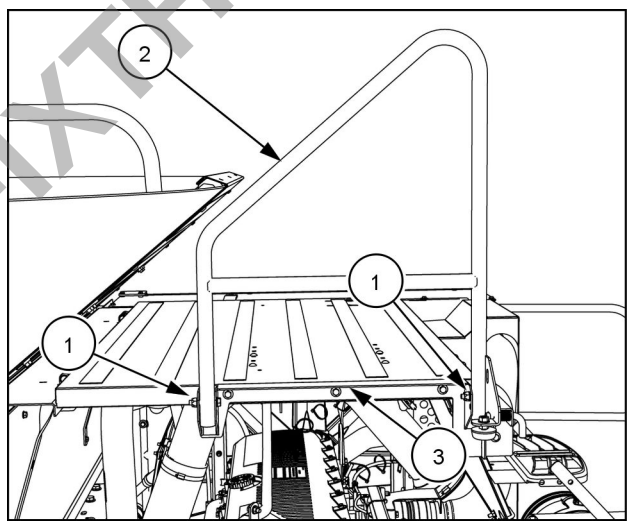
⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. Disengage all drives.
2. Engage parking brake.
3. Lower all attachments to the ground, or raise and engage all safety locks.
4. Shut off engine.
5. Remove key from key switch.
6. Switch off battery key, if installed.
7. Wait for all machine movement to stop.
Failure to comply could result in death or serious injury.

W0047A

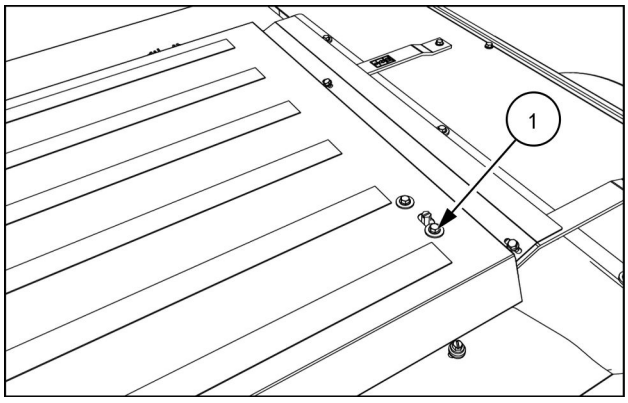
NOTE: *After removing components from the combine, place in a safe place out of the way.*

1. Remove the hardware **(1)** securing the hand rail **(2)** to the ladder support frame **(3)**. Remove the hand rail from the combine.



NHIL13CR00268AA 1

2. Unlock the top shield lock **(1)** by turning it to release the locking mechanism.



NHIL13CR00534AA 2

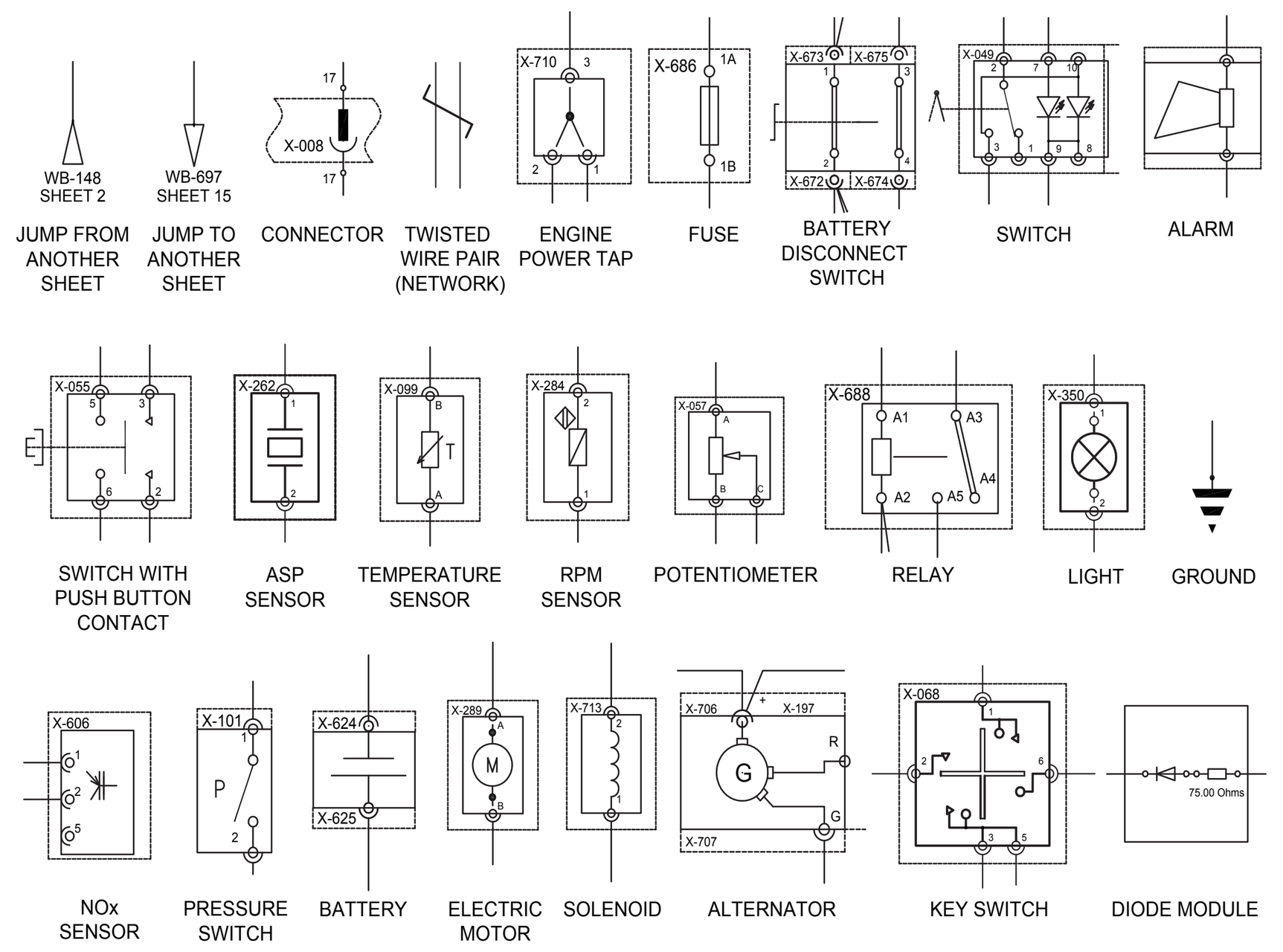
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CR6.80, CR6.90, CR7.90, CR8.90 and CR9.90 COMBINES
47798702
ELECTRICAL SCHEMATIC, NORTH AMERICA

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GROUND LOCATIONS

- Frame GND
- Engine GND
- Cab GND
- Front GND
- Rotor/Walker Section GND
- T4 Engine GND
- Grid Heater GND

LEGEND

- UNSWITCHED POWER
- SWITCHED POWER
- STARTING SEQUENCE
- 24 VOLT SYSTEM
- 24 VOLT SWITCHED POWER

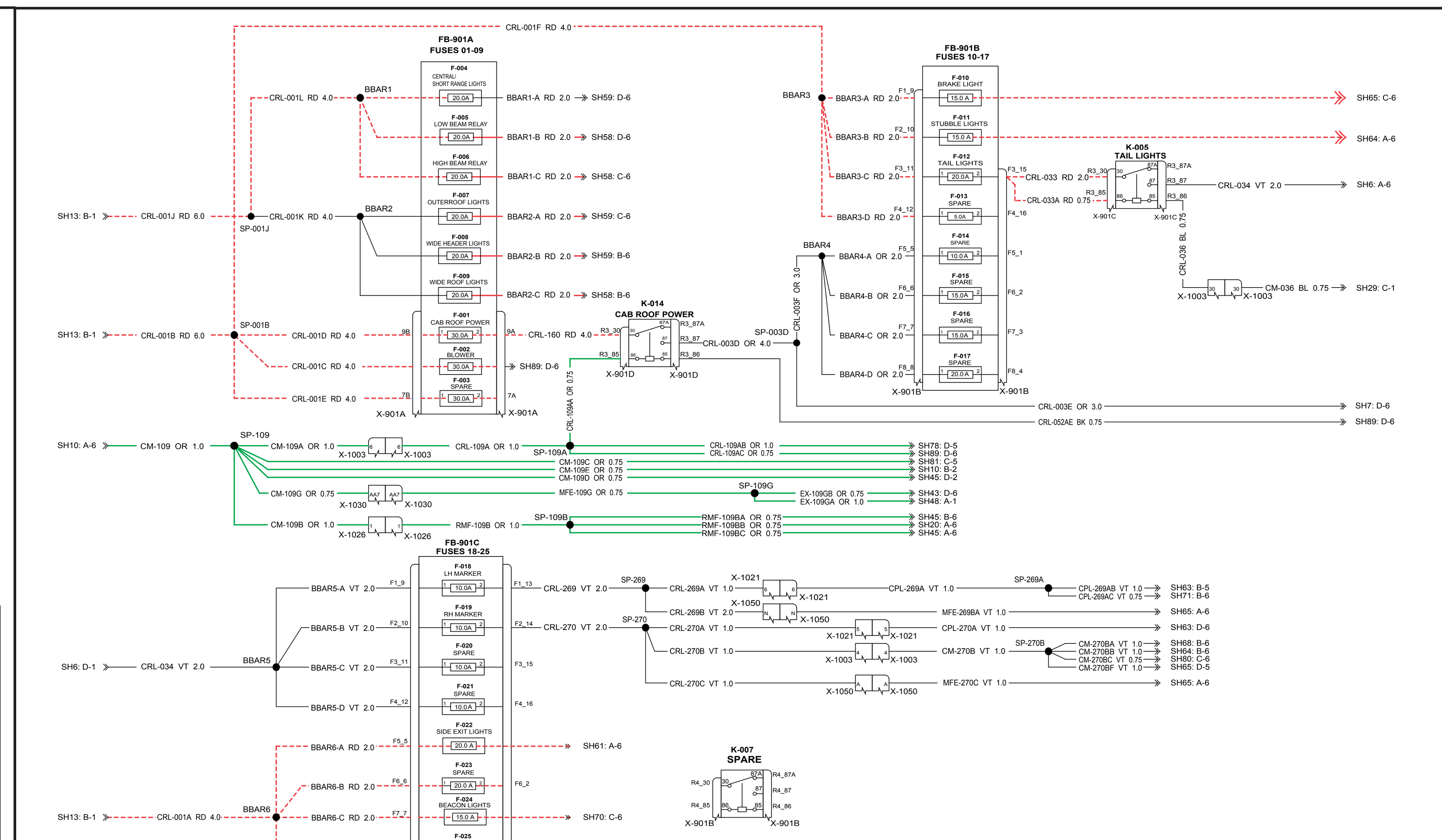
WIRING REFERENCES

Color	Color Code	Function
Black	BK	Ground, Chassis
Blue	BL	Printed Circuit Ground
White	WH	Increasing Actuation
Gray	GY	Decreasing Actuation
Orange	OR	Power After Ignition
Yellow	YE	Signal Wires
Red	RD	Battery Voltage
Violet	VT	Lighting
Pink	PK	Reference Voltage

MF - 431 - YE
- WIRE COLOR
- CIRCUIT NUMBER
- HARNESS CODE

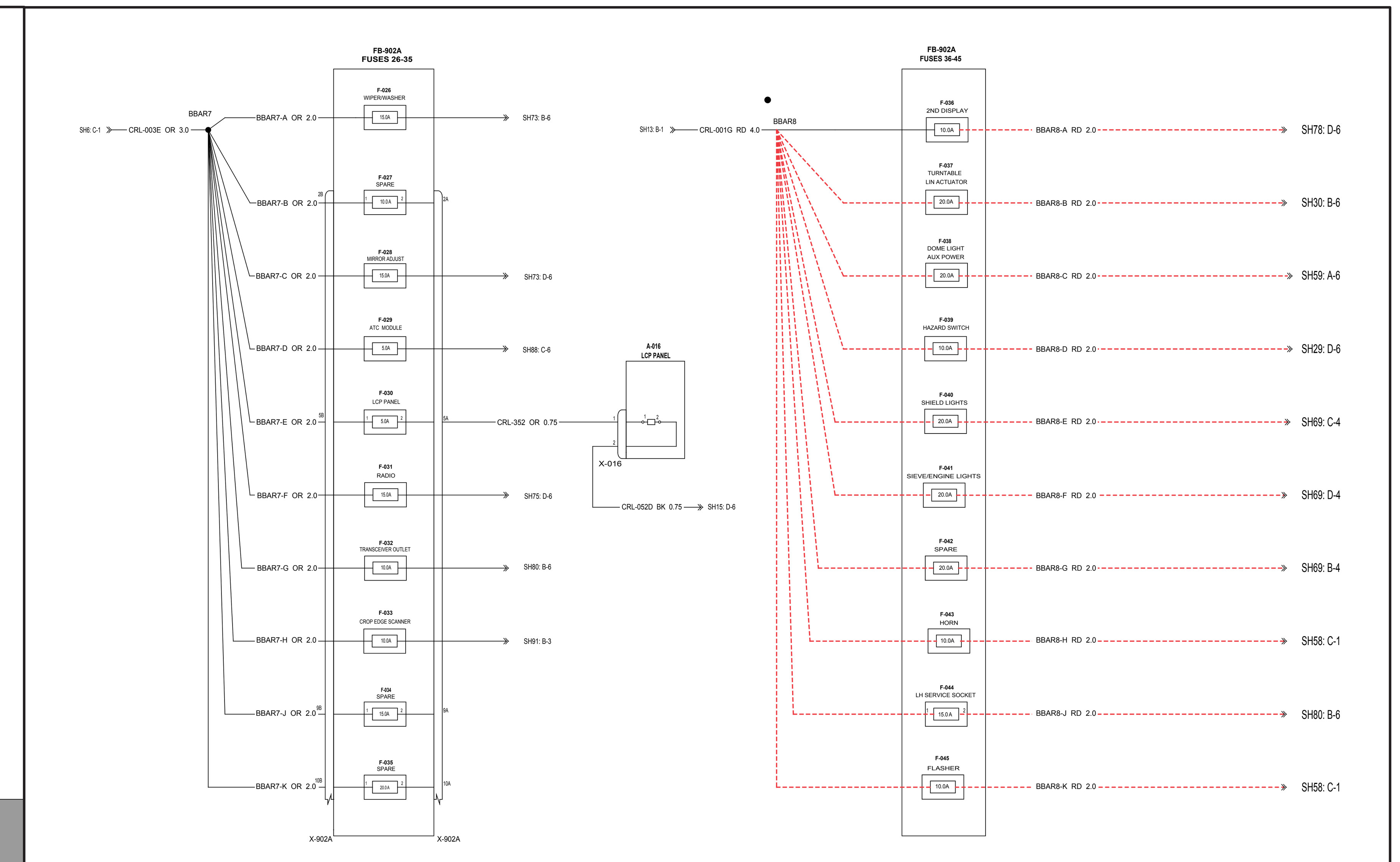
COMPONENT LEGEND

Label Prefix	Component Type
A	Electronics
B	Sensors
D	Diodes
E	Lights
F	Fuses
G	Generators
H	Audio
J	Outlets
K	Relays
M	Motors
Q	Circuit Breakers
R	Resistive
S	Switches
W	Splice Blocks
Y	Solenoids

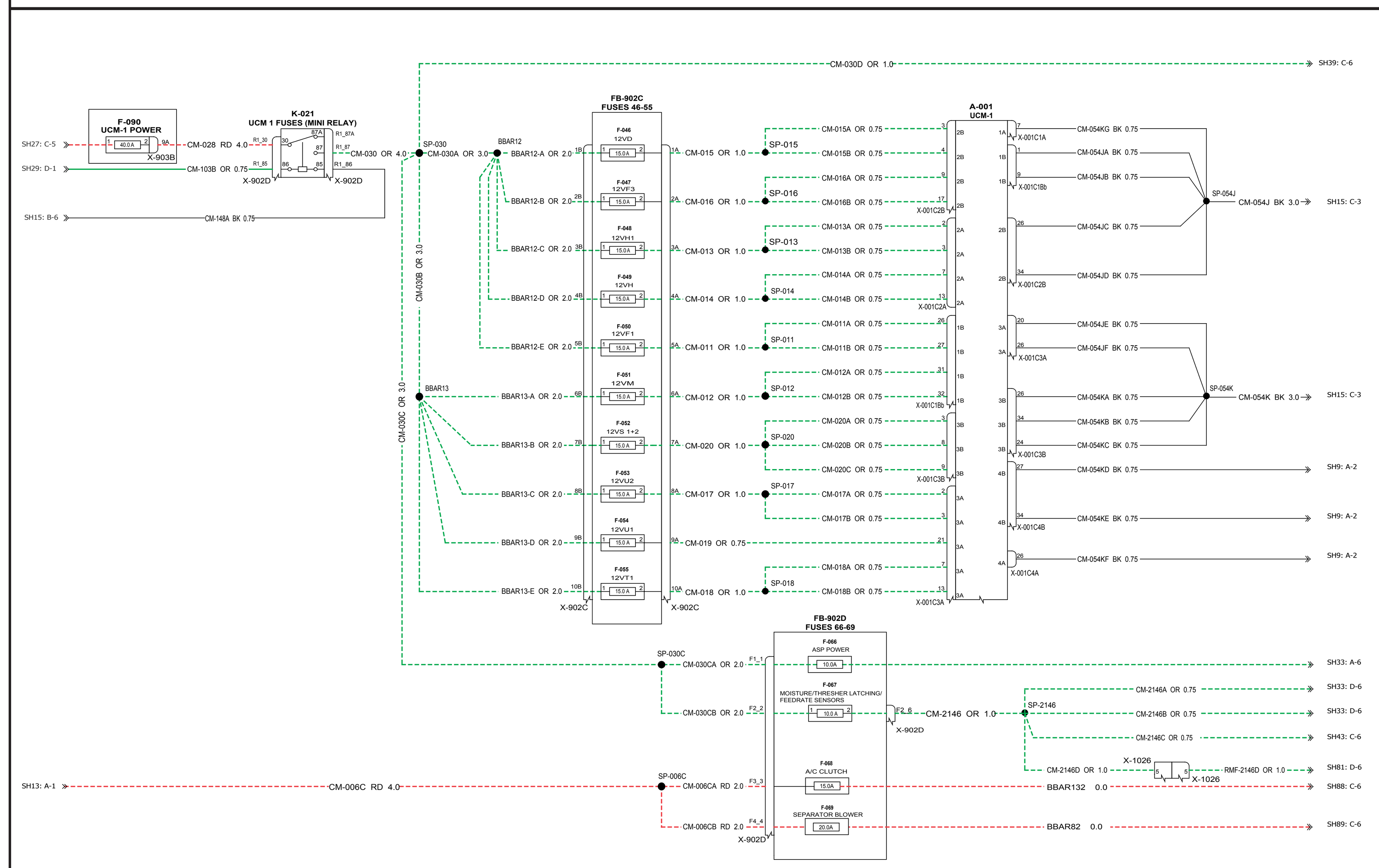


SHEET 1 THROUGH SHEET 5 ARE BLANK

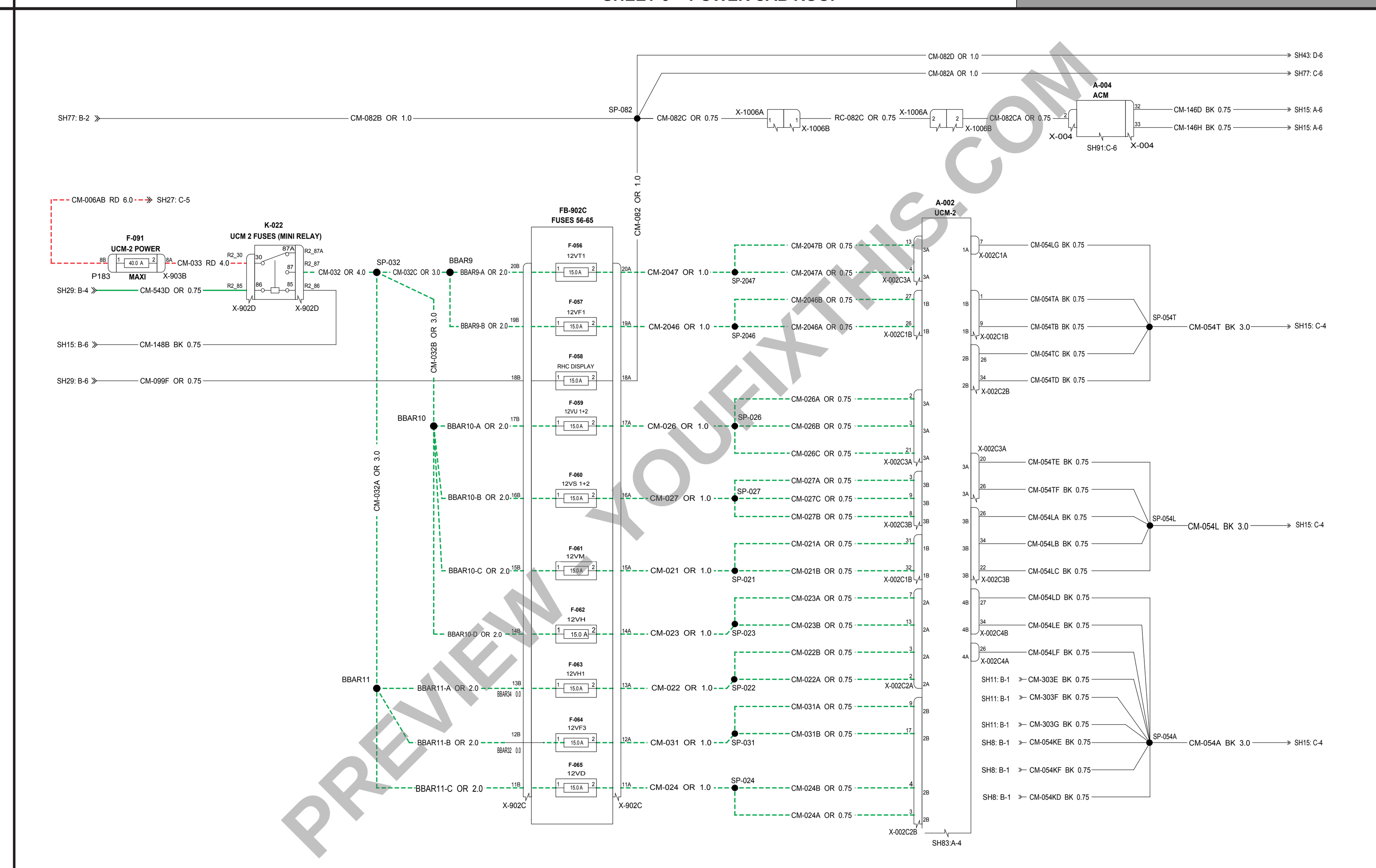
SHEET 6 - POWER CAB ROOF



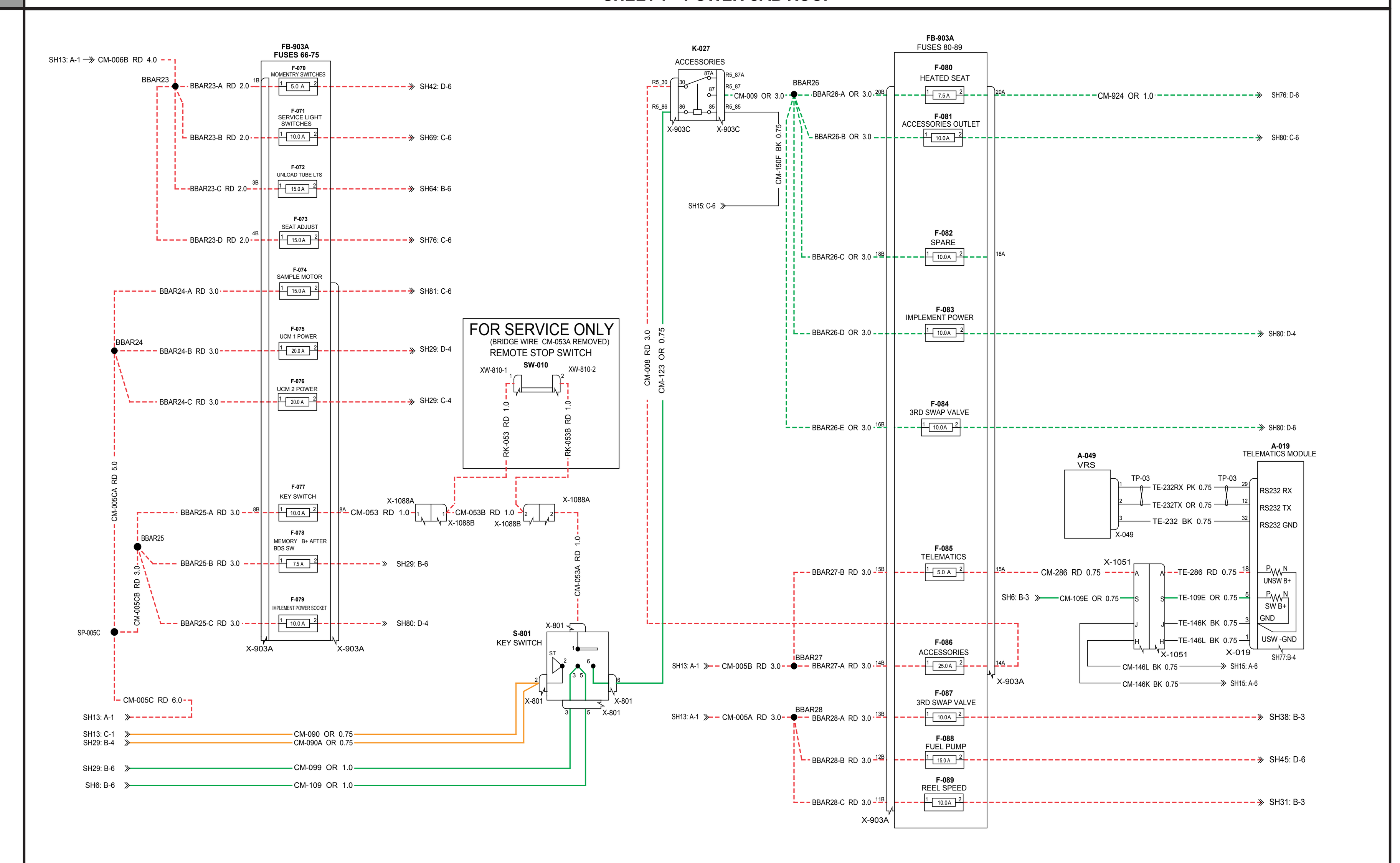
SHEET 7 - POWER CAB ROOF



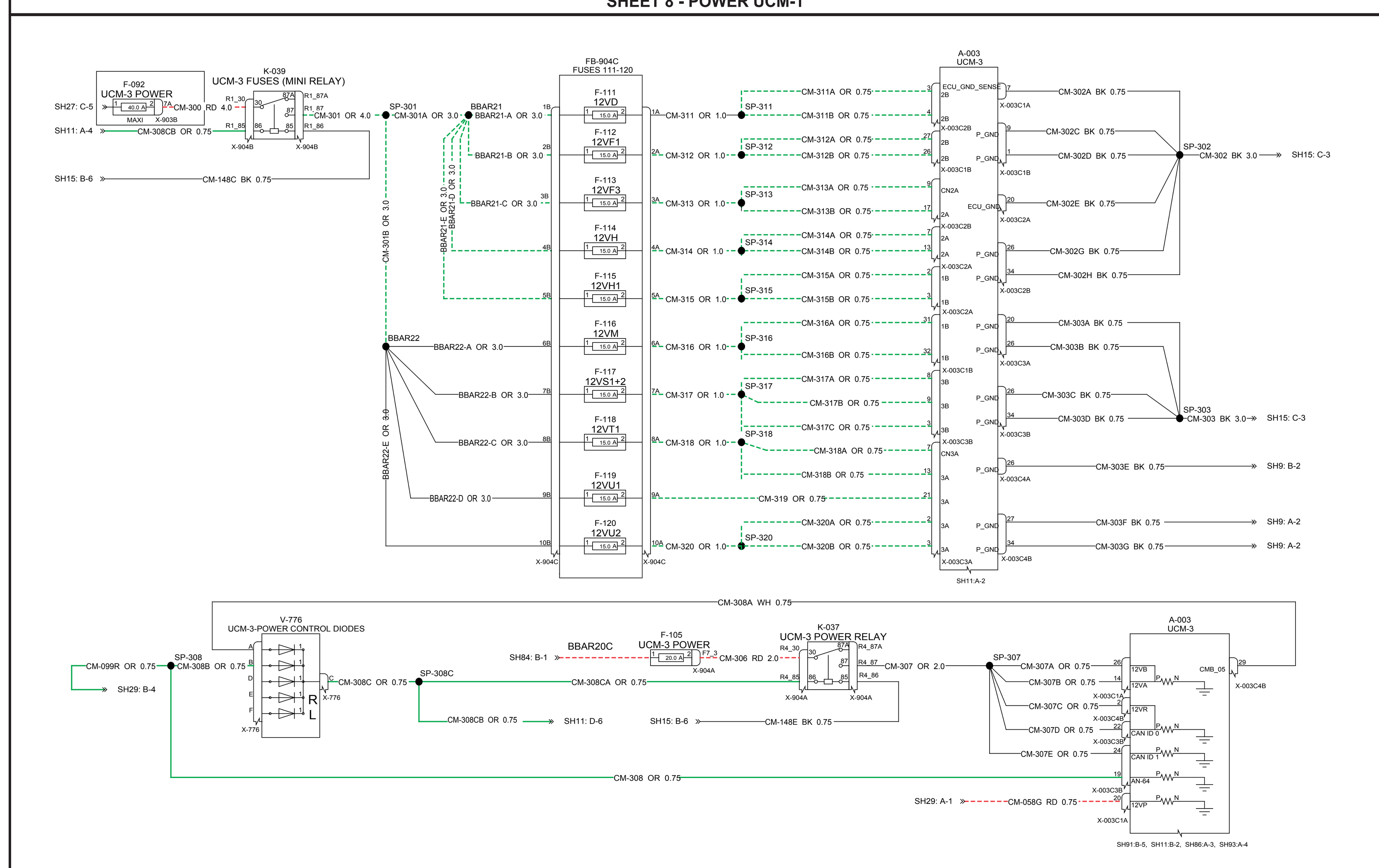
SHEET 8 - POWER UCM-1



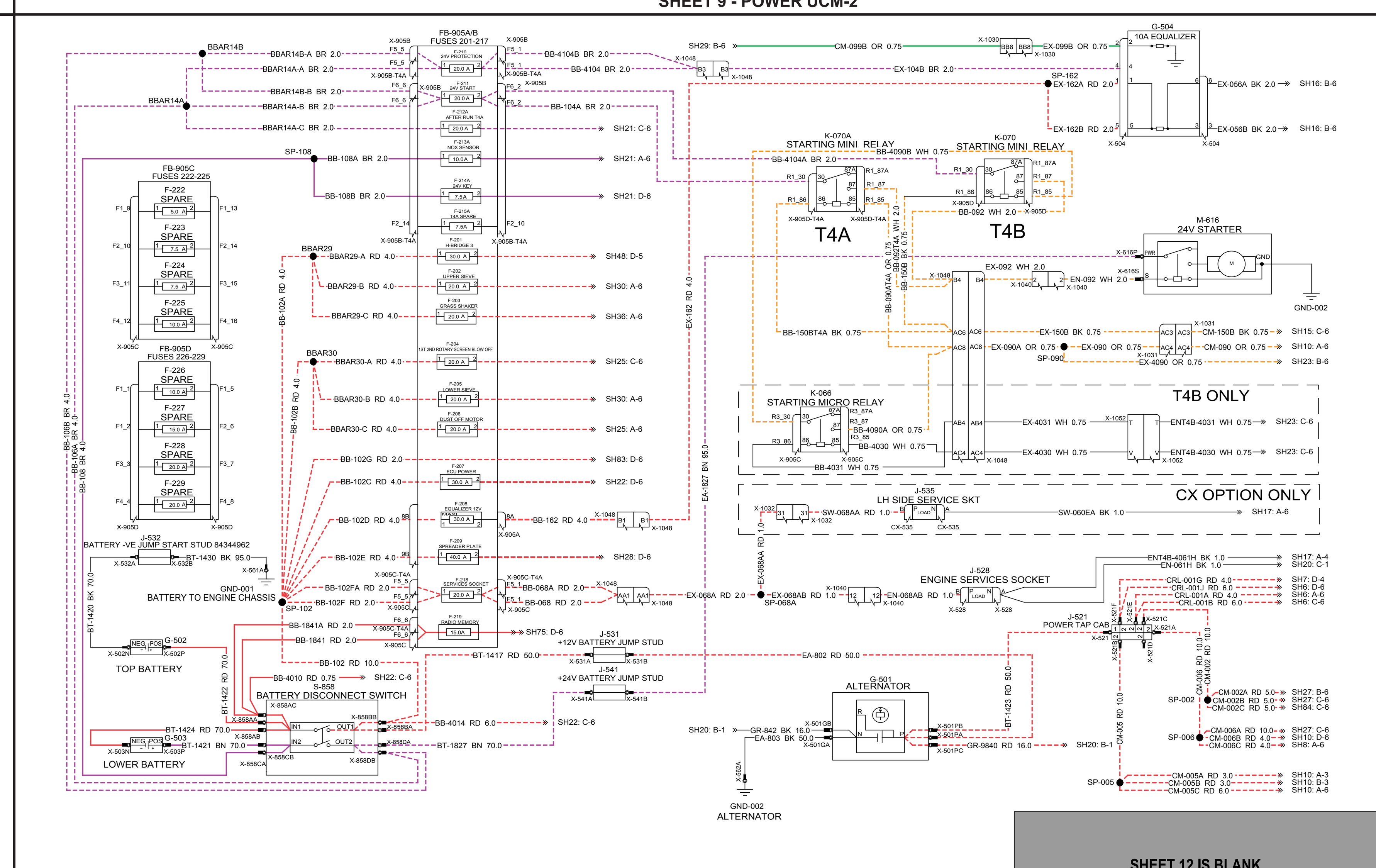
SHEET 9 - POWER UCM-2



SHEET 10 - POWER CAB

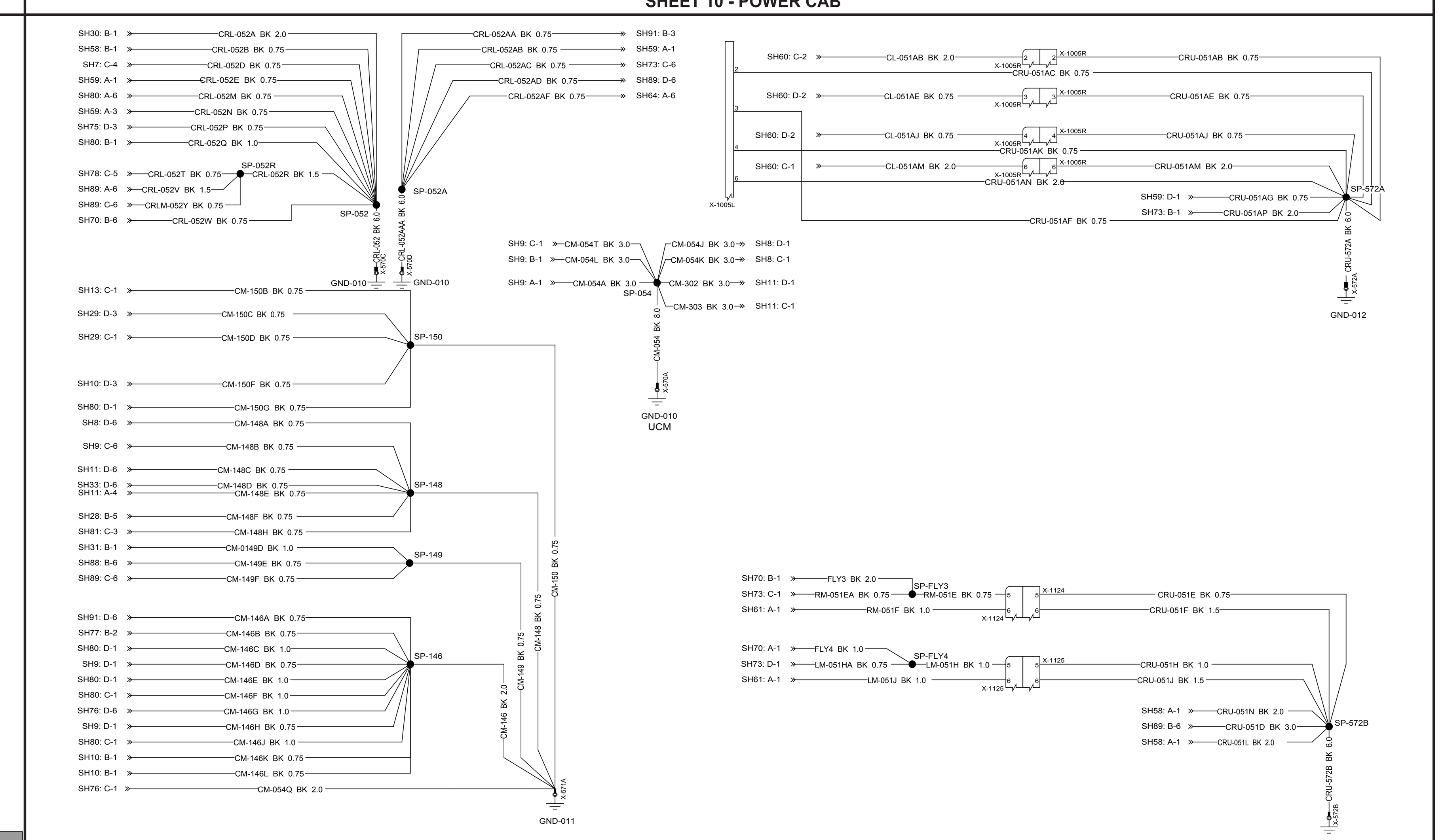


SHEET 11 - POWER UCM-3



SHEET 12 IS BLANK

SHEET 13 - STARTER CHARGING



SHEET 14 IS BLANK

SHEET 15 - GROUND CAB: ROOF, FRONT FRAME, UPPER & LOWER ROOF

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Wiring harnesses - Electrical schematic sheet 34 – Thresher

Type	Component	Connector / Link	Description
Sensor	**B-113**	**X-113**	MECHANICAL STONE ROLL RPM (DSP)
Connector	X-1019A	**X-1019A**	FRONT FRAME TO FEEDER EXT
Connector	X-1019B	**X-1019B**	
Connector	X-1020A	**X-1020A**	
Connector	X-1020B	**X-1020B**	JUMPER TO FEEDER HEADER
Connector	X-113	**X-113**	

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DTC 18DE-NH3 sensor short in heater circuit causing overheating

Control Module : ECU

Context:
The NH3 Control Unit A-9101 is required to report information at regular intervals to the Engine Control Unit (ECU) A-9000 via Controller Area Network (CAN). If a sensor over heating condition exists, this fault will occur. This fault is considered a second failure fault because it requires two different failures to activate. The Heater + (positive) and - (negative) control circuits are shorted to a voltage source and ground, respectively. For information regarding the functional operation of the NH3 sensor B-9110 refer to **Ammonia (NH3) sensor - Dynamic description (55.988)**.

Cause:
The NH3 Control Unit A-9101 has reported a short to voltage source and short to ground condition in the Heater + (positive) and - (negative) control circuits.

Possible failure modes:

1. Faulty NH3 sensor B-9110 to NH3 Control Unit A-9101 wiring, heater negative line is shorted to ground.
2. Faulty NH3 Control Unit A-9101, hardware or firmware.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Verify the condition of the NH3 sensor B-9110.

   Disconnect the NH3 Control Unit A-9101 to NH3 sensor B-9110 harness (cable) from the NH3 Control Unit A-9101 at connector **X-9137**.

   Use a multimeter to measure the resistance and check for continuity on the harness (cable) side:

From	To	Value
X-9137 pin 1	**X-9137 pin 5**	There should be between **2.8 - 4.0 Ω**.
X-9137 pin 1	All other pins	There should be no continuity
X-9137 pin 5	All other pins	There should be no continuity

   A. If the measured resistance is within the specified range and the harness (cable) wiring is not shorted, continue with Step .**3**.

   B. If the measured resistance is not within the specified range or the harness (cable) wiring is shorted, replace the NH3 sensor B-9110 and continue with Step **3**.
3. As there is no method for field testing or re-flashing the sensor controller and the only battery level voltage available in the NH3 Control Unit A-9101 to NH3 sensor B-9110 harness (cable) is the NH3 sensor B-9110 heater + (positive) circuit wiring, replace the NH3 Control Unit A-9101 and check to see that the fault is resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU A-9000 for the appropriate software and re-flash, if necessary.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

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A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

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Place the key switch in the ON position.

Use a multimeter to check for voltage:

From	To	Result
Suspended Tracks Pressure (STP) harness side of connector X-235 pin B	Chassis ground	Should be approx. **12.0 V**

A. If the voltage reading is greater than **12.0 V**, continue to Step **5**.

B. If there is approx. **12.0 V**, continue to Step **4**.

4. Check for an open condition.

Place the key switch in the OFF position.

Use a multimeter to check for continuity:

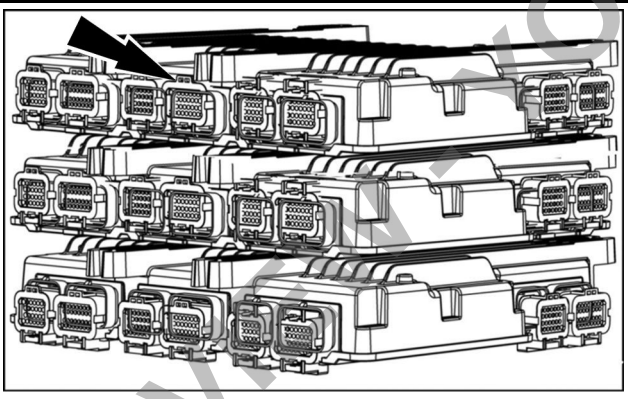
From	To	Result
Suspended Tracks Pressure (STP) harness side of connector X-235 pin A	Chassis ground	Should be continuity

A. If there is continuity, continue to Step **5**.

B. If there is no continuity, there is an open condition between connector X-235 pin A and connector X-003C2A pin 26, wire 344 blue. Locate the open conductor. Repair the open conductor.

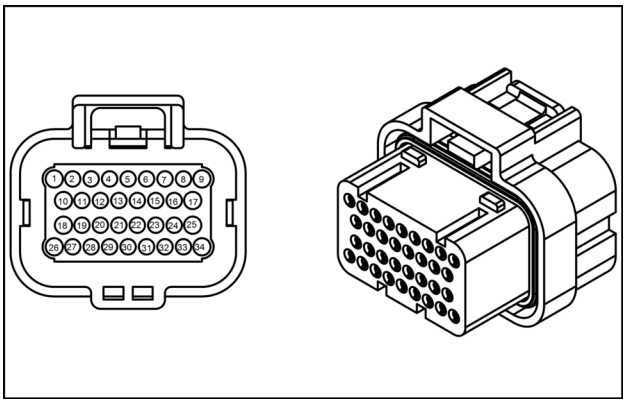
5. Check for a short to high condition.

Disconnect the Cab Main (CM) harness from the UCM at connector X-003C2B.



NHIL14AF01909AA 3

Connector X-003C2B is located under the right hand console.



82028495 4

Connector X-003C2B.

Use a multimeter to check for voltage:

From	To	Result
UCM connector X-003C2B pin 32	Chassis ground	Should be approx. **4.75 V**

A. If the voltage reading is greater than **4.75 V**, the UCM has failed internally. Load the appropriate module software. If the fault re-occurs, replace the module.

B. If there is approx. **4.75 V**, there is a short to high condition between connector X-003C2B pin 32 and connector X-235 pin C, wire 333 yellow. Locate the shorted conductor. Repair the shorted conductor.

6. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

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