

amazon



Service Manual

2019 Morgan Olson Body
2019 Freightliner MT45 Chassis

DRAFT



Driven By You



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**NOTE: USE ONLY GENUINE MORGAN OLSON PARTS
USE OF NON OEM PARTS MAY VOID YOUR WARRANTY
AND/OR VIOLATE FMVSS SAFETY STANDARDS**

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www.morganolsonparts.com

Contents

CONTENTS	3
BODY TIE/DOWNS	4
DOORS	
Side Doors Adjustments & Lubrication	5-9
Bulkhead Door Adjustments & Lubrication	10
Rear Door Adjustments & Lubrication	11-21
GAS SPRING	22
HEATER	
Motor, Fan & Plenum	23
Troubleshooting	24-37
HOOD	38
LAMPS	39
BODY PANEL REPLACEMENT AND RIVETS	40
WINDSHIELD	
Windshield Removal and Installation	41
WINDSHIELD WIPERS & MOTOR	42-43
360 CAMERA SYSTEMS	44-56
KEY-LESS ENTRY SYSTEM	57-58
ELECTRICAL WIRING DIAGRAMS	59-89



Caution:

Before beginning maintenance, park vehicle on level ground, apply parking brake, turn all power off and secure keys/fobs. Read all instructions before starting maintenance. Always maintain firm footing and control of tools. Follow your Company Safety policies including LOTO (Lock out Tag out), PPE (Personal Protective Equipment) and any other safety policies that apply.

Body Tie/Downs

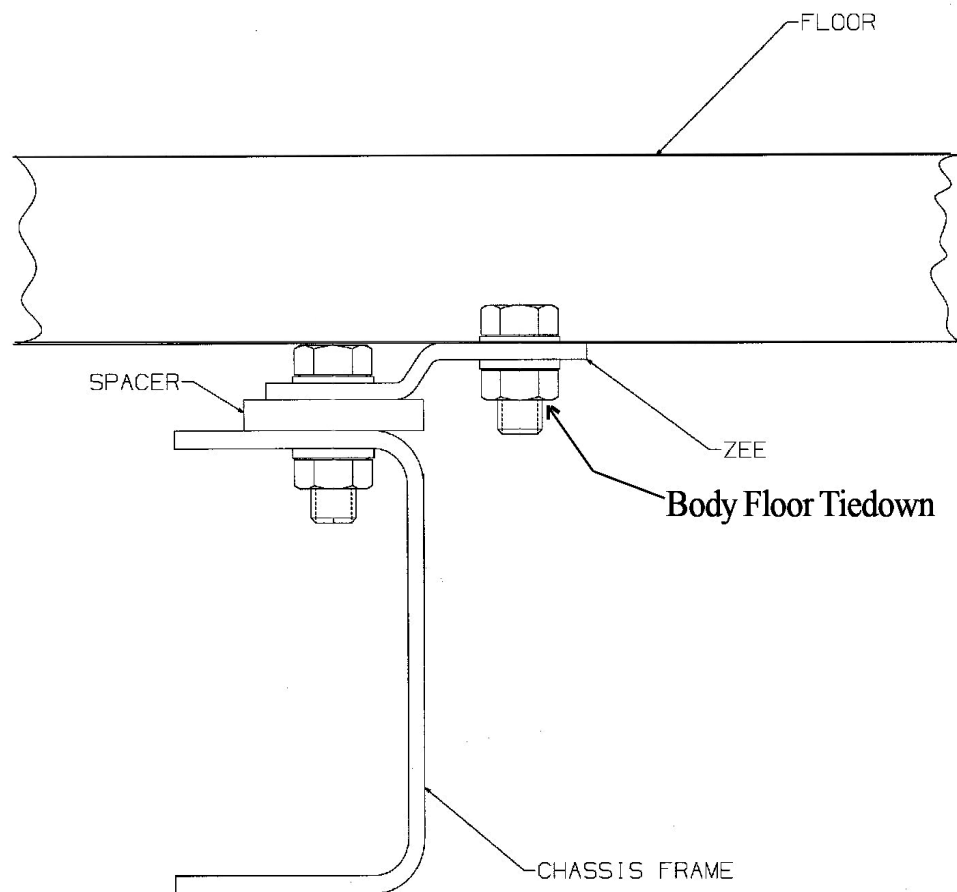
Tie/Down Check:

The floor of the truck is fastened to bolsters that extend the length of the floor.

The lower flanges of the bolsters are mounted to the chassis frame rails.

Both sets of fasteners are torqued to specifications.

All cab and body tie/downs should be checked after 3 months and annually.

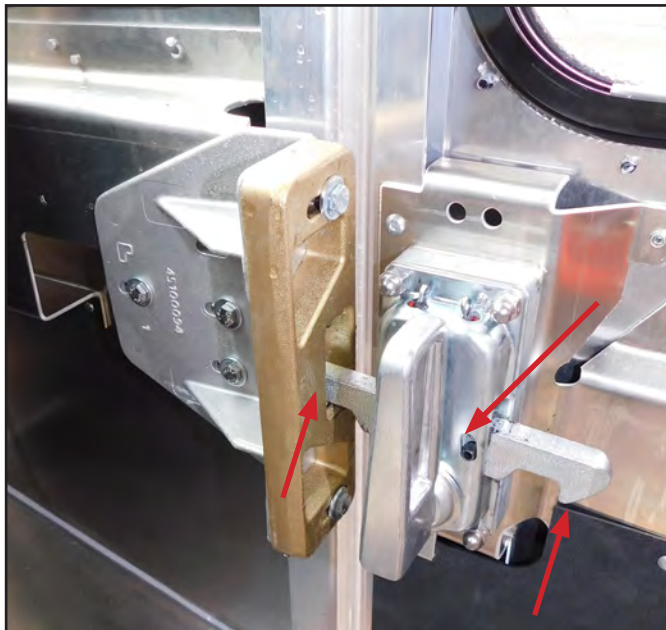


Side Door

Side Door

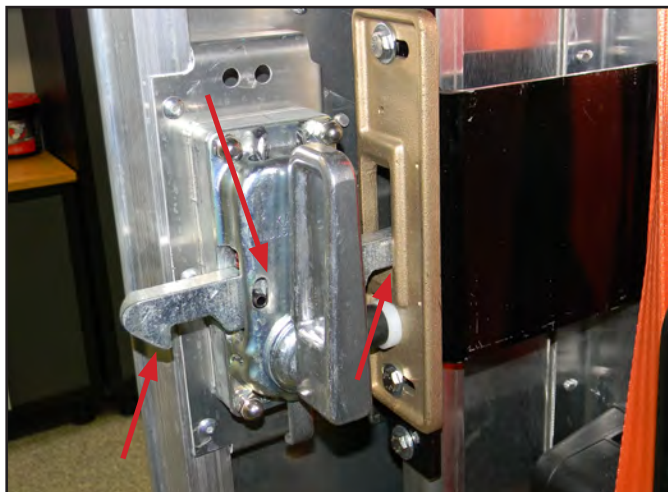
For smooth operation the locking mechanism should be oiled every 3 months or as needed.

Grease should also be added at the contact points of locking mechanism arm and striker. (At opened and closed positions.)



Lubricate latch internal mechanism.

Grease on the latch contact points.



Side Door Removal:

1. Remove the anti rattle clips.
2. Remove the 4 fasteners and the door handles (inner and outer).
3. Using a socket wrench, remove the bolts fastening the door and hanger assembly.
4. To simplify door removal, remove the grab handle located forward of the door.
*Fold side view mirror back.
5. Holding the top of the door in position, pull out on the bottom front corner of the door until it clears the body of the truck. Then tilt the top of the door down and out and remove the door.
6. The upper track is mounted to the header channel. Remove the nuts, and the track.
Reinstall by reversing the removal sequence.

Weather Seal Removal:

1. The forward and rear weather seals are installed simply by sliding into a mated part. To remove simply pull straight out from the top of the door or door frame. Install by feeding into the mated part and sliding into place.

Handle Mechanism Removal:

1. To remove the door handles simply remove the 4 mounting screws. Pay special attention to spacer locations. You can then remove the inside and outside handles. Remember when installing the handles, position of the spacers identical to the way they were at removal.

Wear Strip (Lower) Removal:

1. Remove side door.
2. Remove existing rivets.
3. Replace wear strip and rivet in place.

Side Door Installation:

1. Tilt the top of the door in place first. Now position the bottom of the door into the lower door track, which is in position but not fastened down.
2. Put 1/8" shims between the lower door track and the wear strip.
3. Mount door to the hanger assembly.
4. Install door handles. See page 6.
5. Mount grab handle forward of door. *Return mirror to previous position.
6. For proper door adjustment see page 8.

Door Track and Hanger Plate removal without door removal.

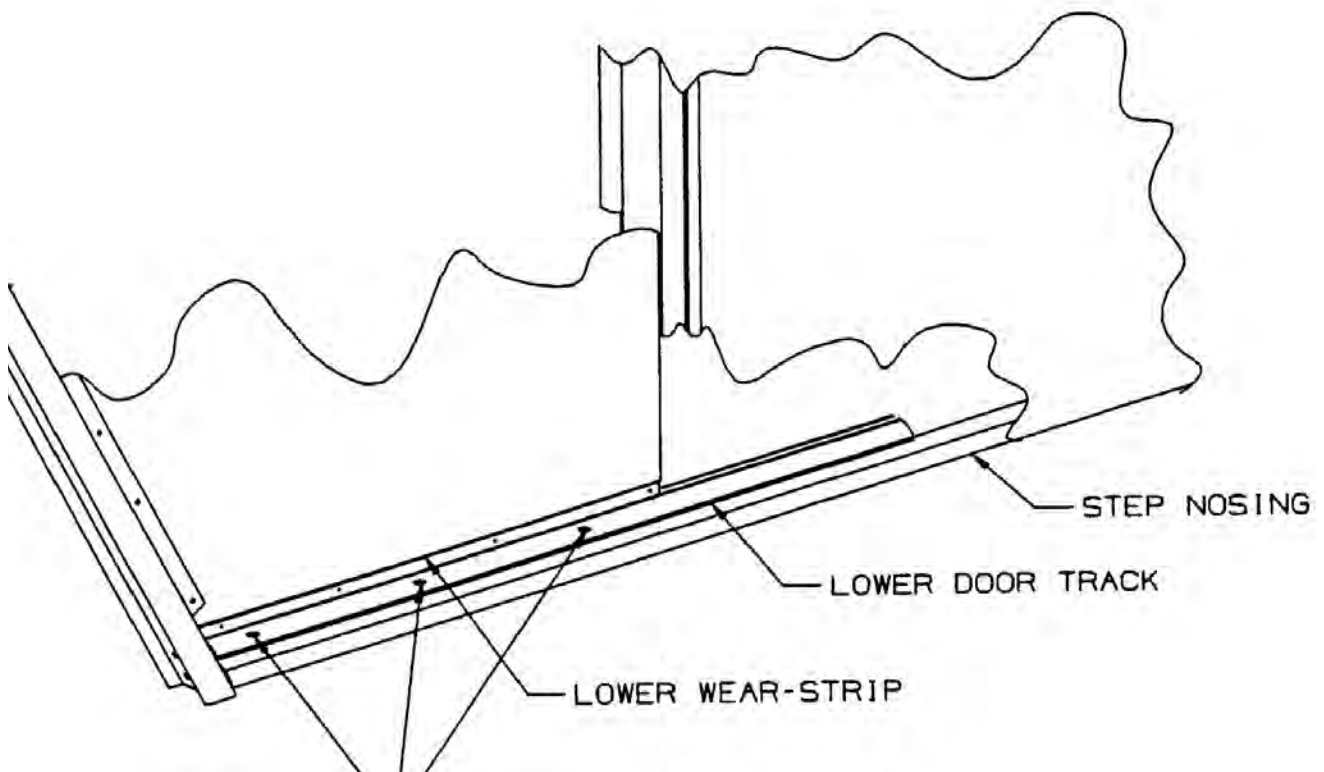
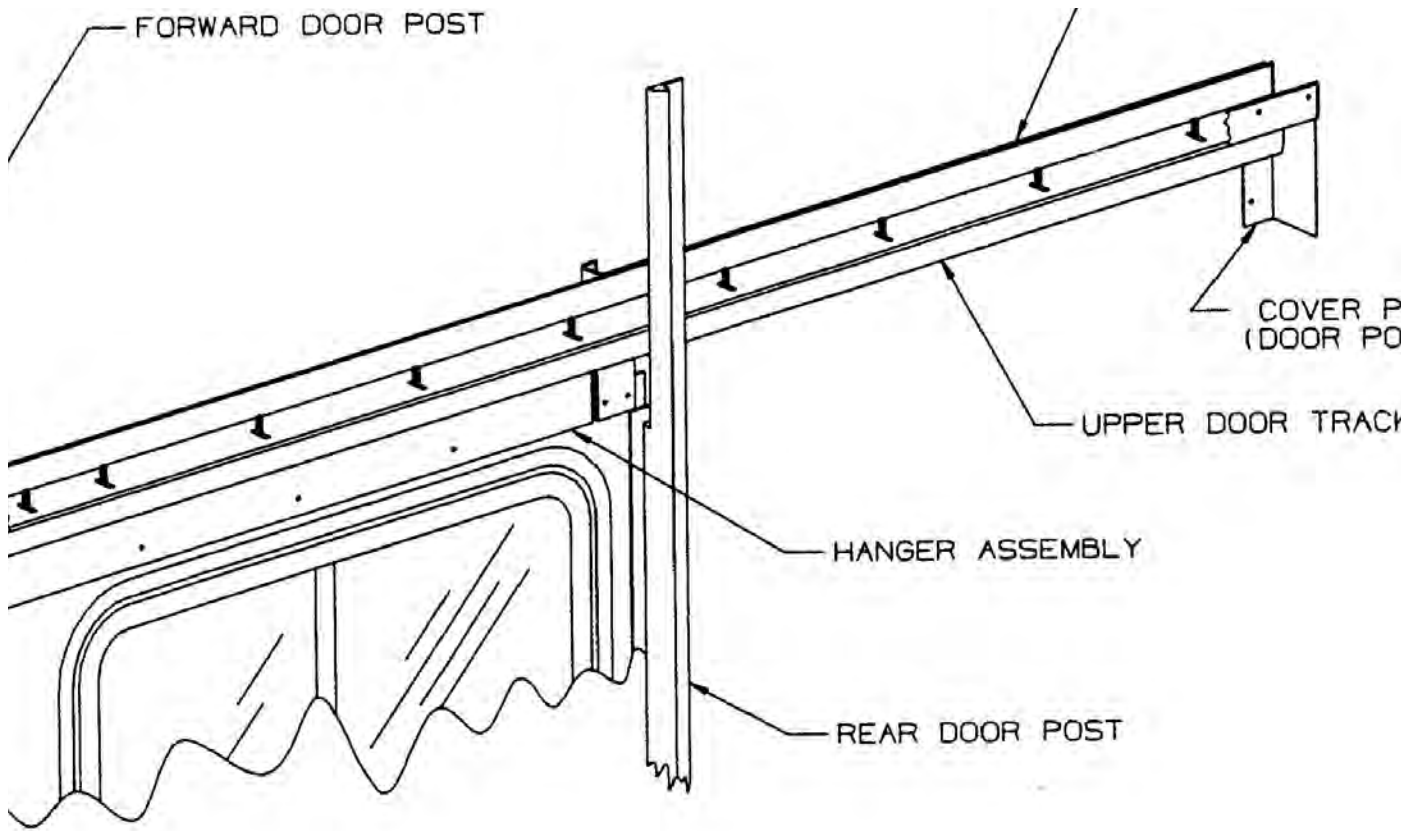
1. Remove access cover located on upper rear corner of the door pocket.
2. Remove the the door hanger nuts and bolts, slide the door hanger plate to the rear of the door pocket and remove.
3. Remove the door track nuts, lower the track away from the header channel and slide towards the rear and out through the access area.
4. Re-install in reverse order and follow the door installation, steps 2 and 3, and adjustment steps.

Side Door Adjustment:

1. Loosen all nuts on the top of the slotted upper door track.
2. With the door closed and engaged in the forward strike, adjust the upper track for uniform lateral placement of the door in the forward post seal. Snug the forward bolt of the upper door track.
3. With the door open and engaged in the rear strike, the rear portion of the upper track can be adjusted laterally to ensure proper alignment with the rear striker.
4. When the door is positioned, tighten a few of the fasteners in the upper track. Operate the sliding door to ensure that it slides and latches properly.
5. When the door is operating properly, tighten all the remaining fasteners in the upper door tracks.
6. Replace any broken studs with .25 - 20x1.00 truss head screw.
7. Adjust Anti-Rattle Clips as needed to reduce door vibration.
8. See illustration on the following page.

Door Latch Adjustment:

1. The door latches (strikers) and the mounting brackets provide for adjustment in a variety of directions.
2. Once the door has been adjusted to slide smoothly, then adjust the strikers for proper latch operation.
3. Adjust the strikers side to side to center the catch; Adjust up and down until the catch is almost bottomed out; Adjust forward and aft to control the amount of compression on the rubber door seal.



Bulkhead Door

Bulkhead Door:

*NOTE: Where grease is required use a **lithium based**.

1. The latch should be greased to prevent sticking. Grease should be applied at contact points of the latch and striker for smooth operation. This should be done every 3 months.
2. Lubricate hanger bearings and body of finger catch latch with penetrating oil; apply a light film of lithium grease to the striker.
3. Adjust bottom guide to within 1/16" from bottom of the channel.





225 NORTH PATTERSON ST.

CAREY, OH 43316

CUSTOMER SERVICE PHONE 877-876-7452

ROLL-UP DOOR PREVENTIVE MAINTENANCE CHECKLIST

⚠ WARNING

The Counterbalance Spring is wound under High Tension. This High Tension Counterbalance Spring can cause Severe Injury or Death. Only Qualified technicians should adjust this spring.

⚠ CAUTION

Read all instructions before starting Preventive Maintenance Checklist. Always maintain firm footing and control of tools.

Adjustments and repairs must be made by trained service personnel using proper tools and instructions.

DO NOT use the rear door pull strap to support yourself when entering or exiting the rear. The strap can break or pull the door down on you. Use the grab handles for aid getting in and out of the rear.

Stand clear of the opening while the door is moving.

NOTICE

To prevent damage to the cargo or vehicle, be sure that the rear door is closed and latched before driving the vehicle.

For more detailed instructional information on repairs and adjustments, see Transglobal's installation and repair manual.

NOTICE

LUBRICATION

Lubricate the Counterbalance Spring, Counterbalance Shaft Bearings, Rollers, Hinges, Top Fixtures, Bottom Roller Holders and Locks liberally with Transglobal Lube. Do NOT use grease. Wipe dirt from track. Frequency of door maintenance will vary with climate conditions and door cleaning procedures. Doors which are steam cleaned will need lubricated more often. Doors on equipment operated in areas where road salts are used will require lock lubrication at closer intervals. Do NOT use any petroleum-based lubricant on rubber door seals.

TGS1000

ADVANTAGES

Long lasting, non-toxic, non-static, non-staining, non-conductive, contains no petroleum distillates, no silicones, no acids, no carcinogens, no halogens and no allergens. Will not dry out, or wash off with water. Will not damage plastics, paints, metals, fiberglass, enamels, or neoprene seals. No petroleum smell.

H- Registered for Food Processing Areas.

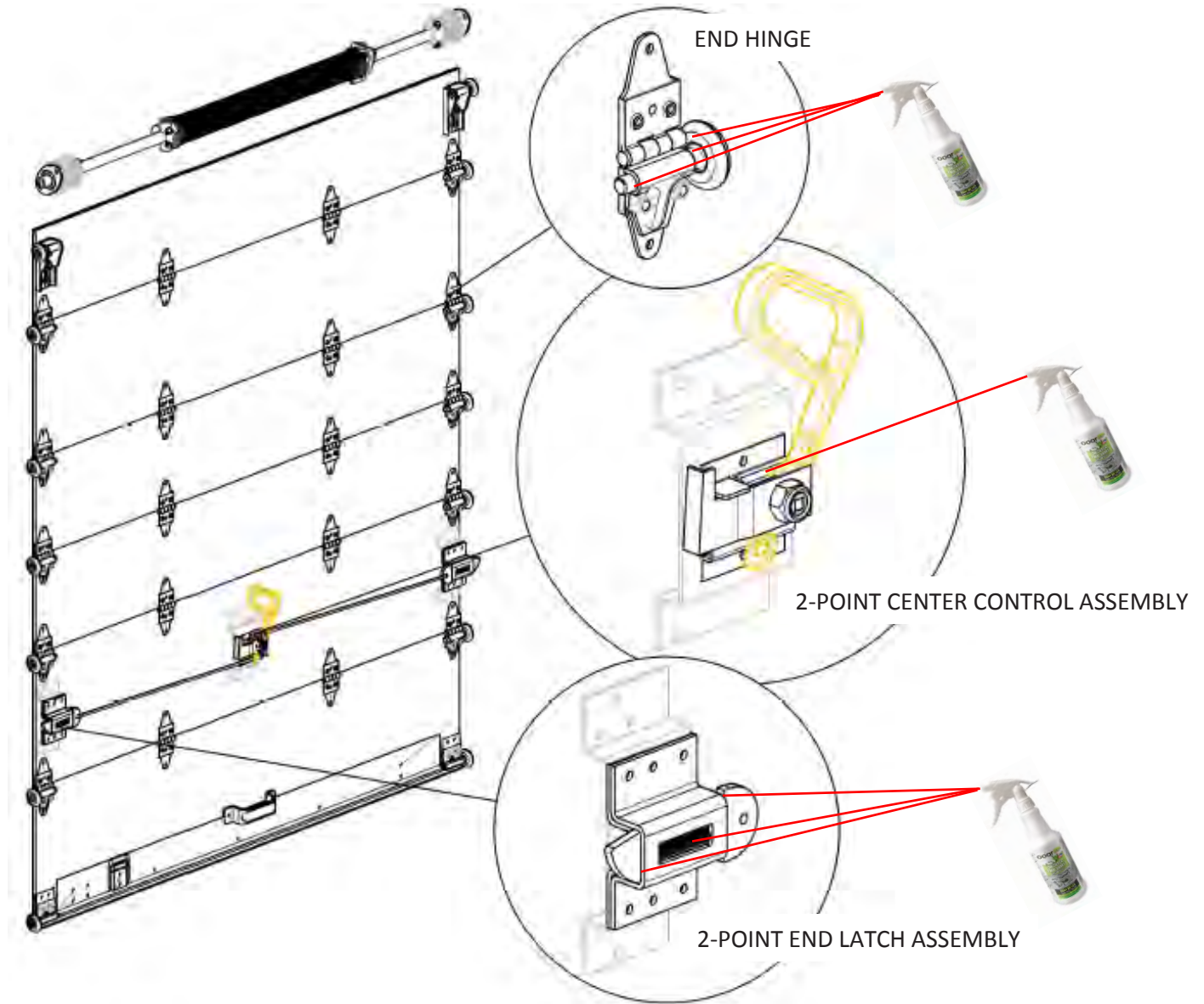
USES

Lubricate and protect locks, hinges, rollers, air tools, roll-up doors, lift gates, springs, chains, and bearings. Cutting oil for drilling and tapping. Penetrates and neutralizes rust on nuts, bolts, screws, equipment and motors. Cleans corrosion and oxidation off battery terminals and metals.

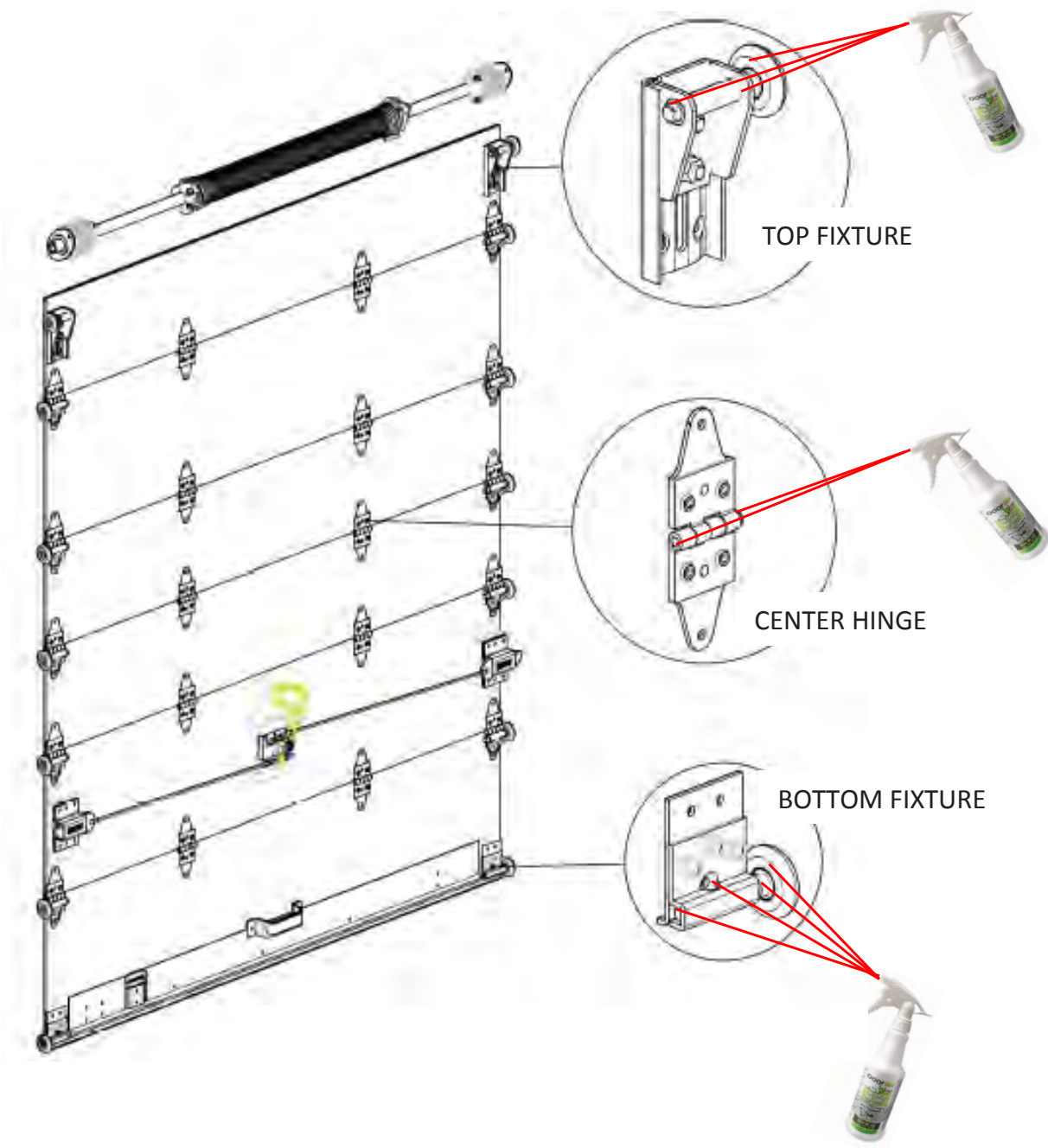


(See  for Lubrication points below.)

LUBRICATION OF END HINGES, 2-POINT CENTER CONTROL & END LATCHES



LUBRICATION OF TOP FIXTURE, CENTER HINGE & BOTTOM FIXTURE

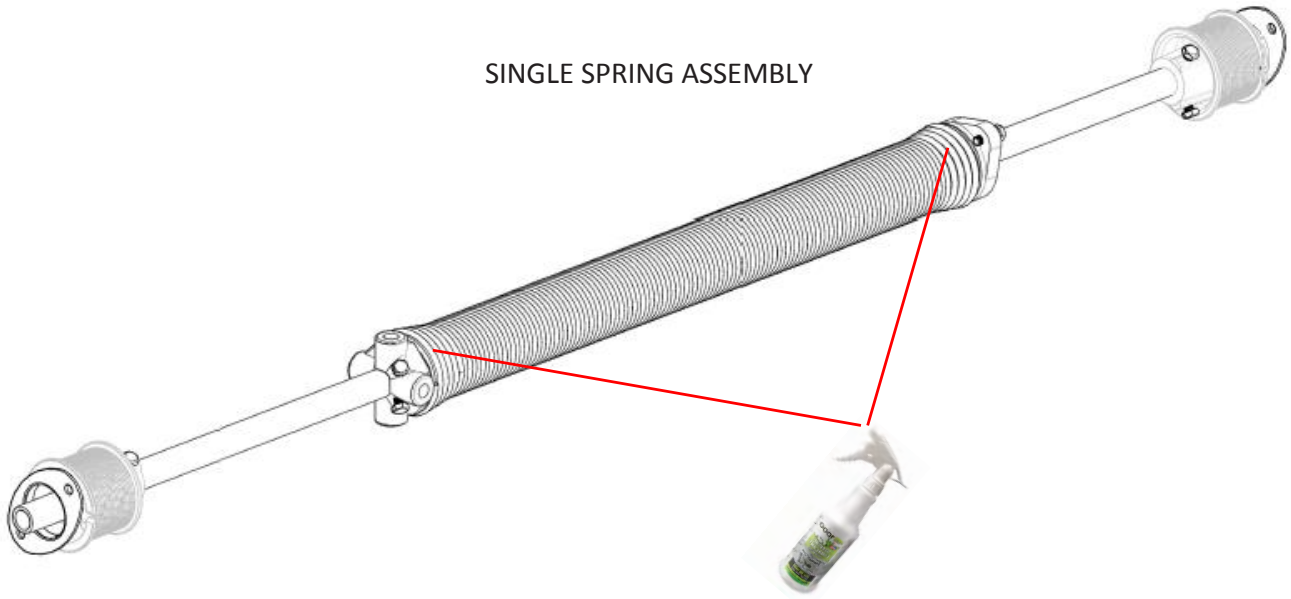


LUBRICATION OF SINGLE AND DUAL SPRING ASSEMBLIES

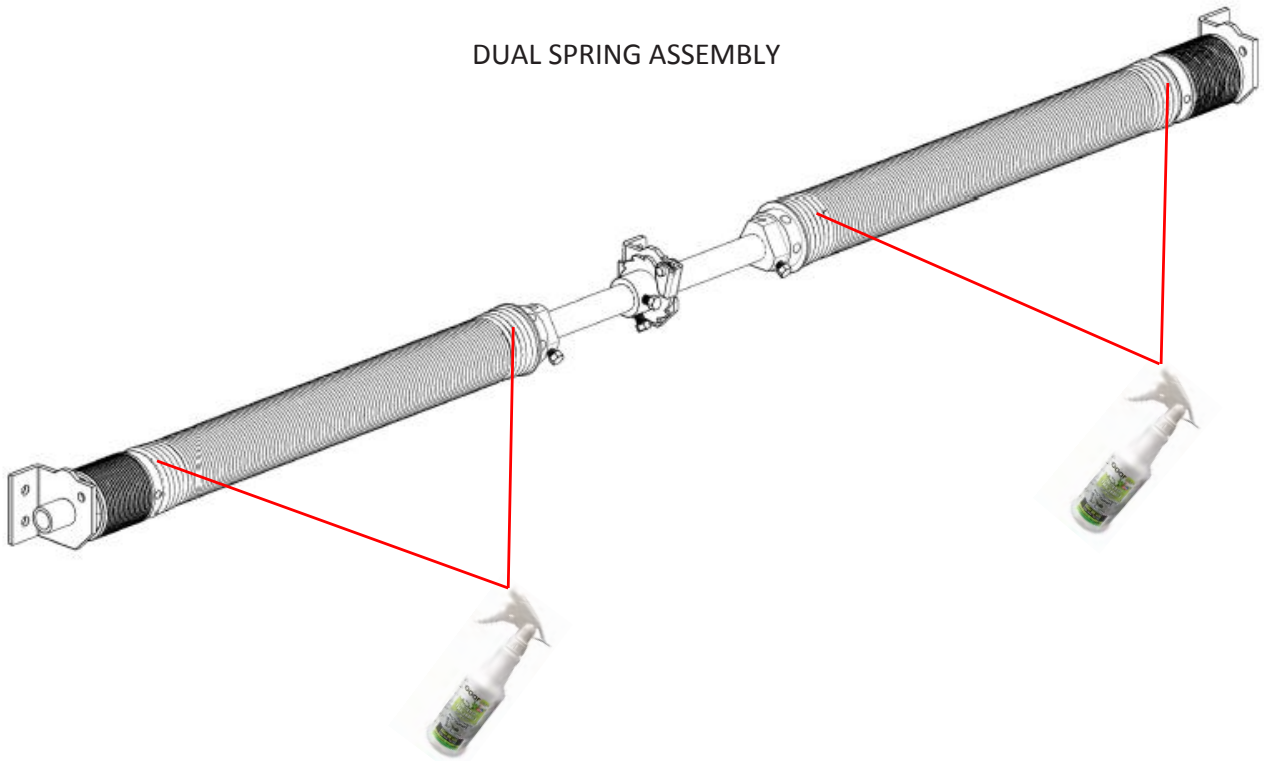
NOTICE

On single and dual spring assemblies – lubricate spring(s) along their entire length to prevent rusting.

SINGLE SPRING ASSEMBLY



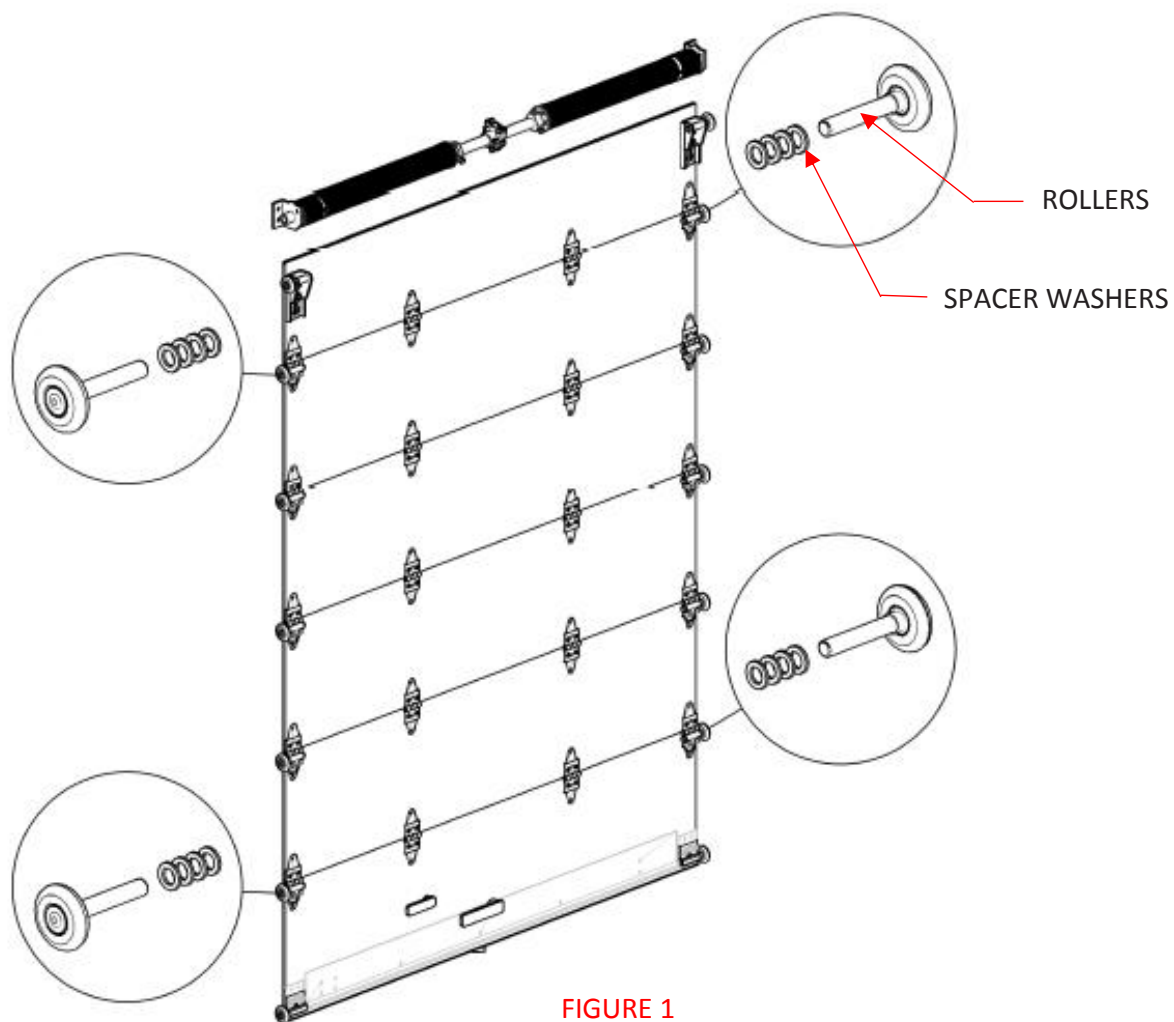
DUAL SPRING ASSEMBLY



NOTICE

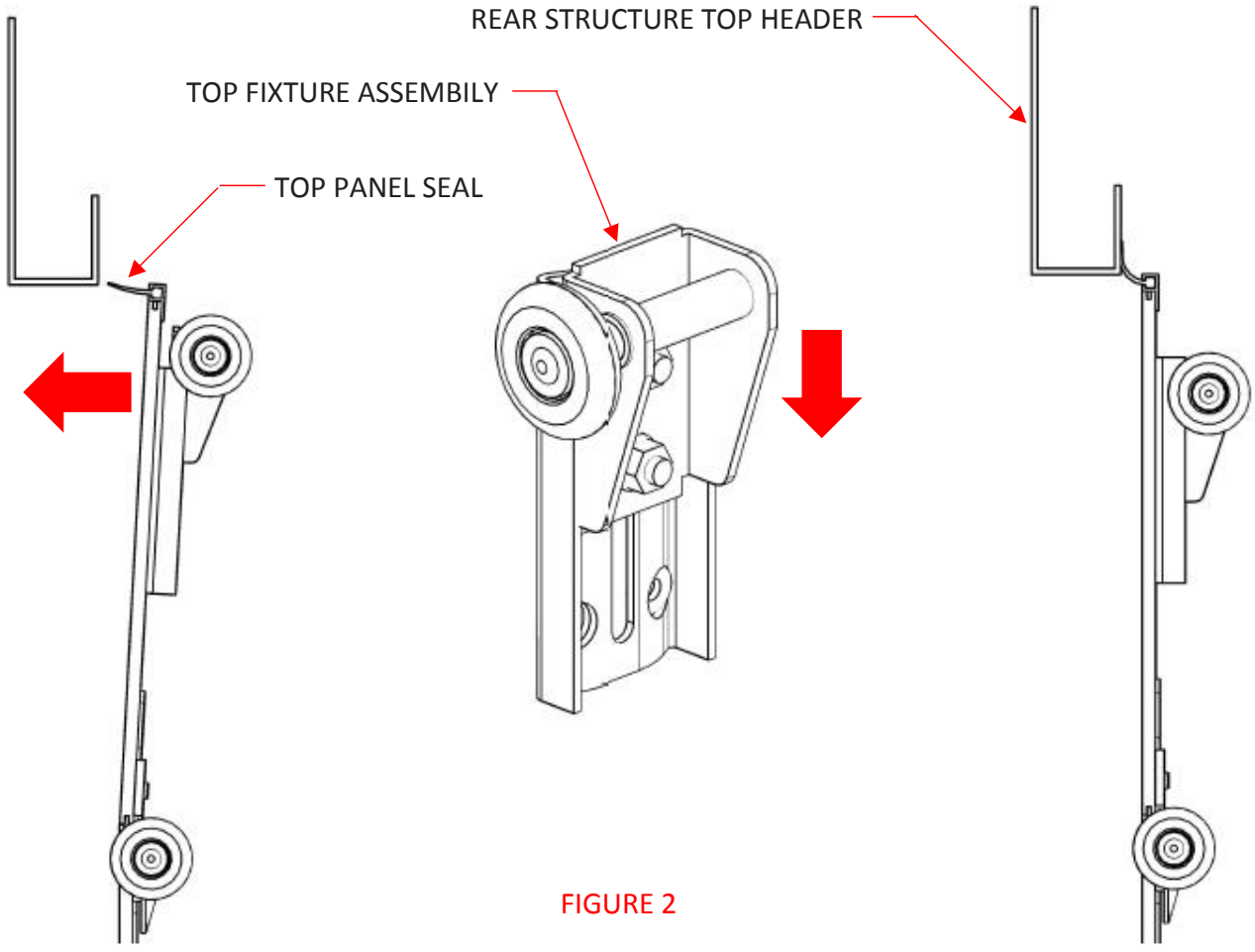
DOOR OPERATION – PLEASE INSPECT THE FOLLOWING:

1. Check to see if the door lock operates easily and latches tight, compressing the bottom seal.
2. Check to see if the door operates freely (up and down) with side play between the tracks and door approximately $\frac{1}{4}$ " to $\frac{3}{8}$ ".
3. Check for loose fasteners or other components.
4. Are the spacer washers installed at the 1st Intermediate hinge and the last intermediate hinge on both sides? (4 required per roller by door design, but NO less than 3 per roller to keep the door from contacting the track). (See Figure 1).
5. Are the side seals installed in a manner that the seal uniformly contacts the door but doesn't bind or impede the door operation?
6. Inspect Roll-up Door Side Seals for wear/damage and replace if needed.
7. Does the top seal contact the header at the ends well as the middle while keeping the top panel in a vertical position? (See Figure 2).
8. Inspect Roll-up Door Top Seals for wear/damage and replace if needed.
9. Inspect Roll-up Door Pull Strap for fraying or wear damage and replace if needed. (See Figure 3).
10. On Roll-up Doors with 2-point latch system, Inspect Door Latch Cables for fraying or wear damage and replace if needed.



NOTICE

Loosen the two 5/16" nuts on both top fixture assemblies, adjust the top fixture slides until the top door panel is in the same plane as the rest of the door panels and retighten 5/16" nuts.



VIEW OF INCORRECT
TOP PANEL SEAL
CONTACT TO HEADER

VIEW OF CORRECT
TOP PANEL SEAL
CONTACT TO HEADER

PULL STRAP

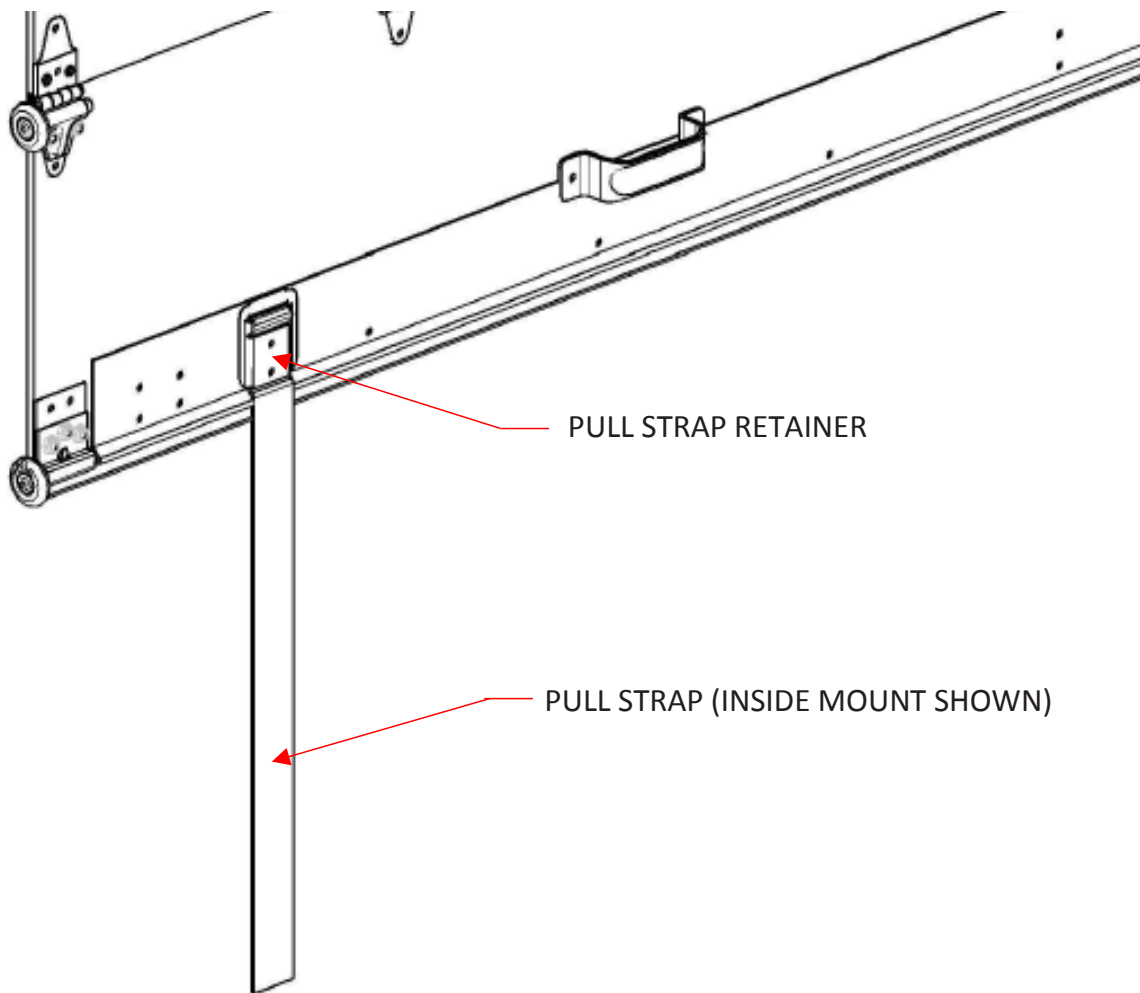


FIGURE 3

⚠ CAUTION

Failure to replace worn or frayed door pull strap may result in injury.

SPRING BALANCER – PLEASE INSPECT THE FOLLOWING:

Note: All spring systems are designed to assist in the operation of opening and closing the door. The door should never free fall or fly open buy itself. All spring systems are designed for both cables to have uniform pull so the door doesn't pull to one side or the other. **Any required service to the counterbalance, springs or cables, should only be performed by a qualified technician.**

1. Does the door “balance” (neither rise nor fall) without assistance?
2. Are the cables (door in open position) nearly vertical from the cable anchor bracket to the cable drum? The cables should NOT skip grooves or travel over another cable on the drum.
3. Inspect Roll-up Door Cables for fraying or wear damage. (See Figure 4).
4. Inspect Cotter Pins and Cable Anchor Bracket Pins for wear damage. (See Figure 4).

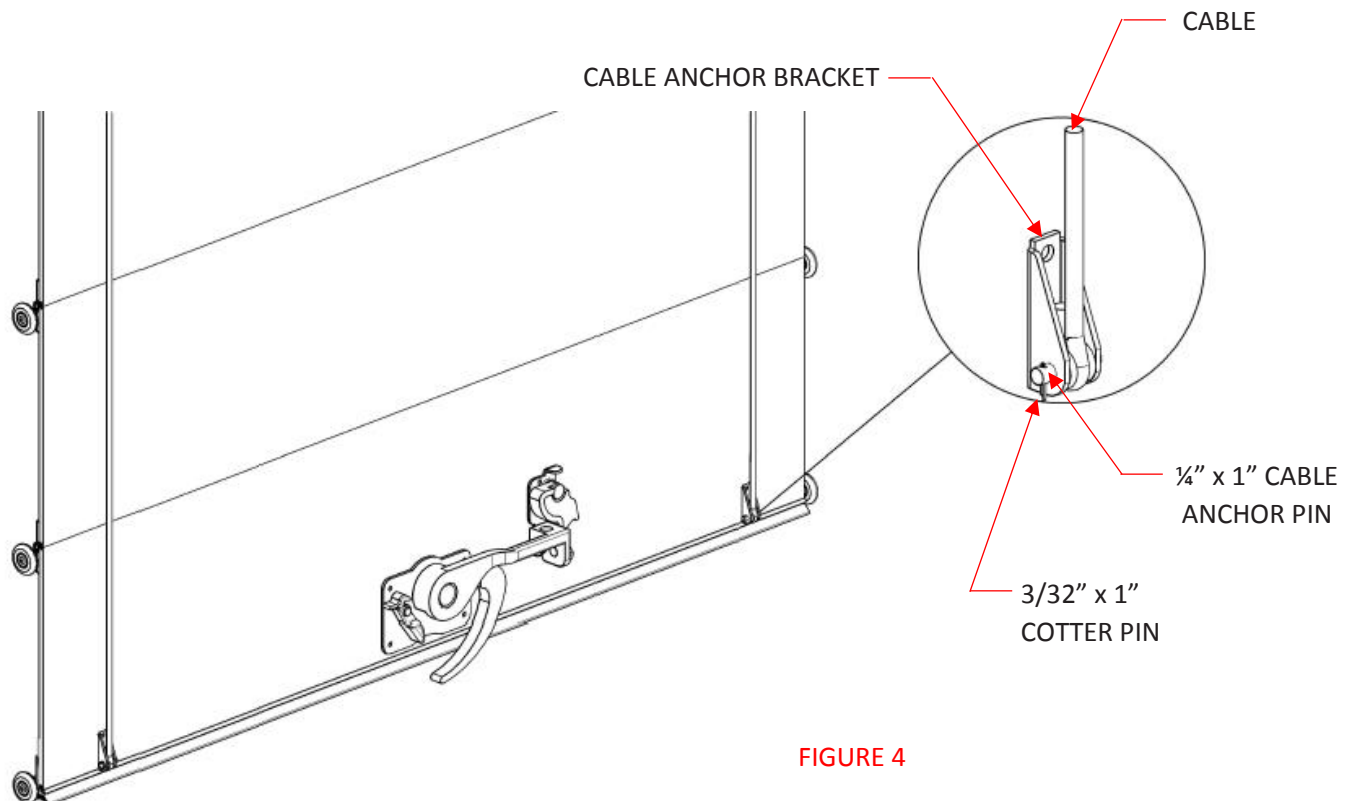
SINGLE SPRING – PLEASE INSPECT THE FOLLWING:

1. Are the cable drums tight against the counterbalance shaft bearings, the set screws properly tightened, and both cables are tight and have equal tension? (See Figure 5).

DUAL SPRING – PLEASE INSPECT THE FOLLWING:

1. Are both springs wound to the same number of turns?

Any required service to the counterbalance, springs or cables, should only be performed by a qualified technician.

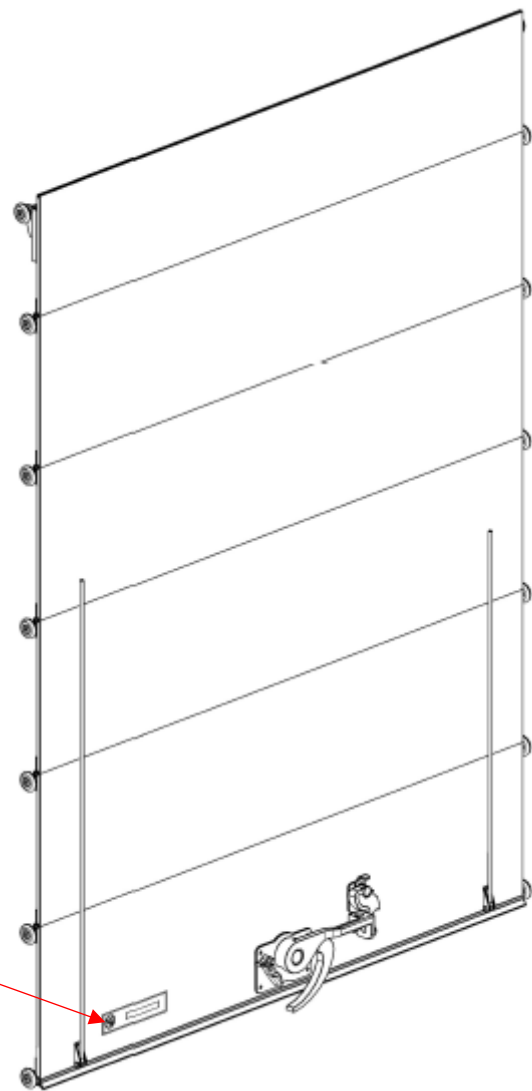
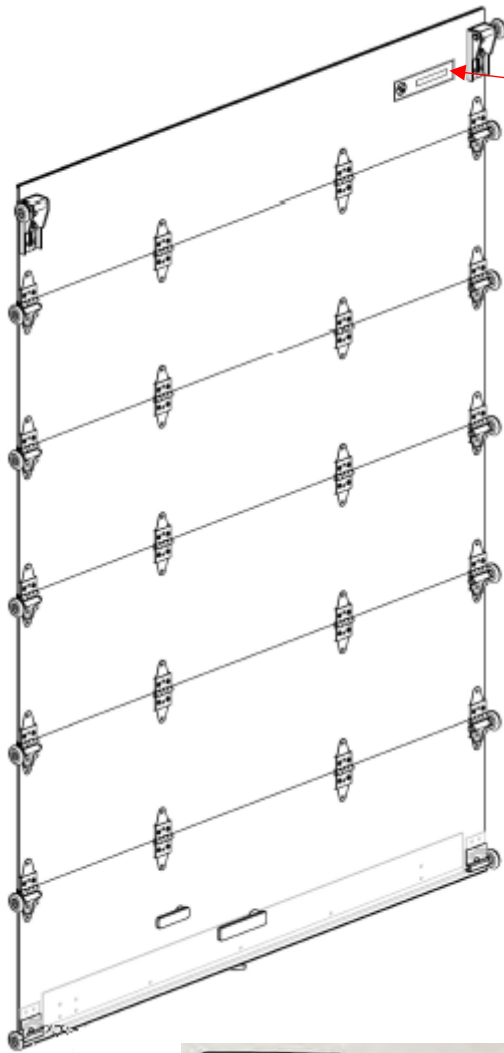
**FIGURE 4**

LOCATIONS OF TRANSGLOBAL'S SERIAL NUMBER PLATES

NOTICE

Transglobal has (2) location. Outside mount / bottom panel / RS (Standard) and inside mount / top panel / RS.

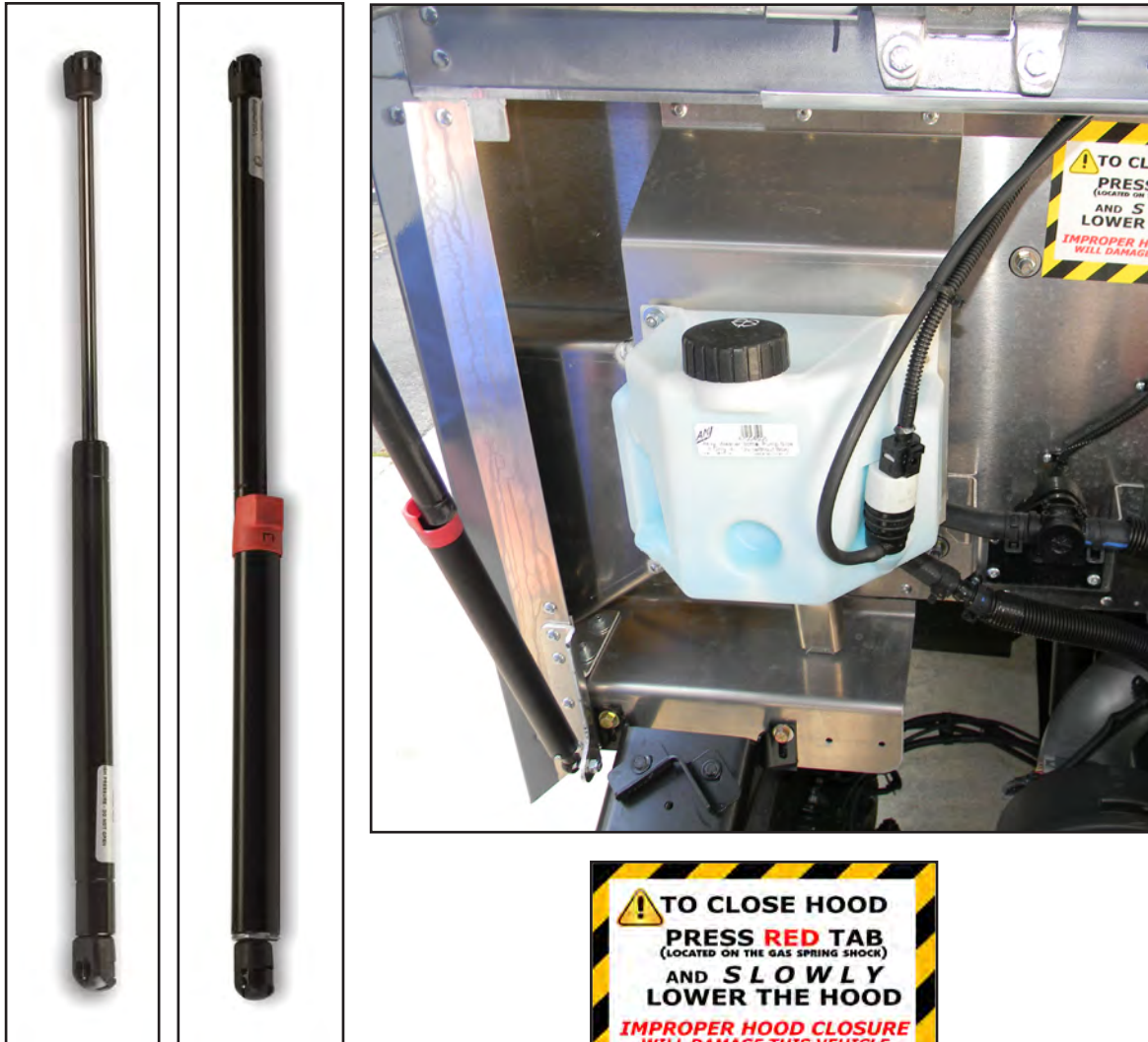
When ordering parts for roll-up door, specify the serial number of the door.



Gas Spring

Gas Spring Replacement:

1. With the hood safely propped, remove the upper and lower retainer clips. Once the clips have been removed a slight tap will remove the gas spring from the ball studs.
2. For safety reasons, when replacing the gas springs use only Morgan Olson OEM replacement parts.



Heater

Motor and Fan Replacement:

1. The heater is mounted to the right hand dash panel.
2. With the power to the motor off, disconnect the motor leads.
3. Remove motor mounting screws. Remove the motor and the impeller wheel.
4. Take out the set screw to remove the impeller wheel (squirrel cage).
5. For installation, reverse the sequence.



Plenum

Plenum Replacement:

1. Detach air inlet hose from plenum.
2. Disconnect wiring harness at heater box and instrument panel harness.
3. Remove fasteners from plenum diffuser (located on top of the windshield rail).
4. Remove the fasteners located on top of the windshield rail.
5. Installation sequence is opposite of removal.

SERVICING AND TROUBLESHOOTING

A/C-HEATER-DEFROSTER

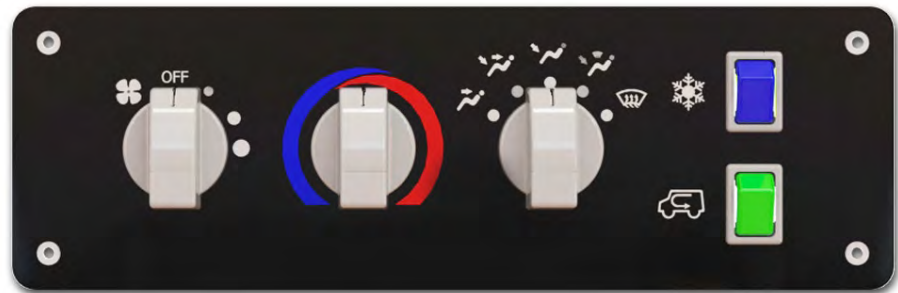
CONTROL PANEL OPERATION

BLOWER CONTROL The blower control provides three choices of air velocity in every operating mode. When the blower switch knob is rotated fully counterclockwise (with the knob indicator pointing straight up) the blower is turned OFF. Rotating the knob clockwise will progressively increase the air velocity.

TEMPERATURE CONTROL






The temperature knob controls the discharge air temperature in all operating modes. Turning the knob to the right (red zone) increases temperature; turning the knob to the left (blue zone) decreases air temperature.

Temperature control is achieved through the regulation of engine coolant through the heater coil.



BLOWER CONTROL TEMPERATURE CONTROL MODE SELECTION A/C CONTROL (Upper Switch)
AIR SOURCE (Lower Switch)

MODE SELECTION SWITCH

-  **Dash** When this mode is selected, all air is discharged through the dash louvers.
-  **Bi-Level** With this setting, air is discharged through the dash louvers and onto the floorboard. This is the ideal mode for rapid warm-up in cold weather.
-  **Floor** This mode will direct all air to the floorboard. This mode is most frequently selected when driving in cold weather with a clear windshield.
-  **Floor/Windshield** When this mode is selected, air is discharged onto the floorboard and onto the windshield.
-  **Defrost/De-fog** This mode will direct most of the air to the windshield and provides for rapid defrosting of the outside of the windshield and defogging of the inside surface. A reduced volume is provided for floor heating.



A/C CONTROL

The blue rocker switch will engage the A/C compressor when the upper edge of the switch is pressed. Pressing the lower side of the switch will turn the compressor off.



AIR SOURCE CONTROL

The green rocker switch permits the driver to re-circulate cabin air or introduce outside air to the cabin. Pressing the upper edge of the green rocker will recirculate cabin air; pressing the lower edge of the rocker will return the flow of outside air.

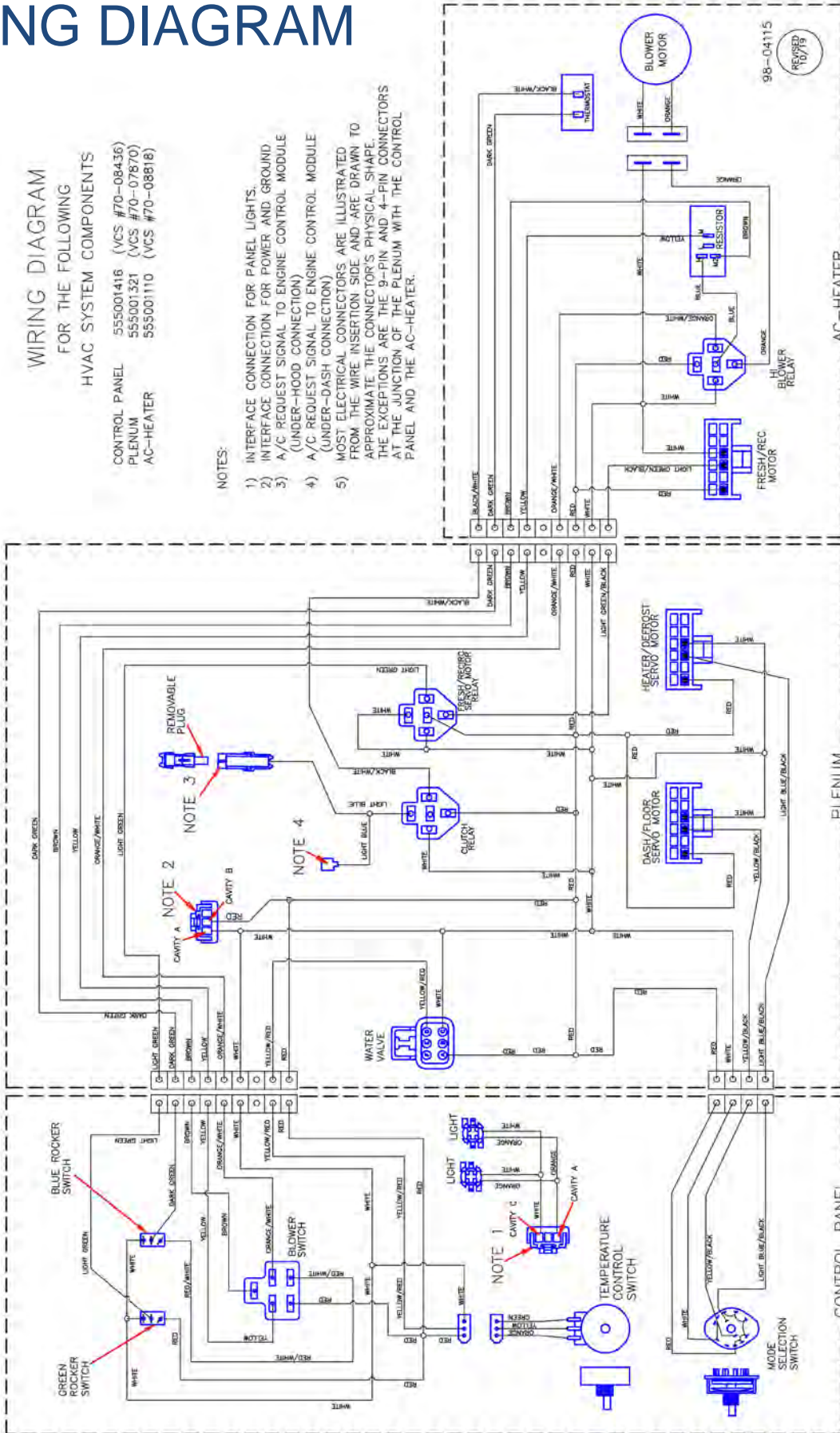
WIRING DIAGRAM

WIRING DIAGRAM FOR THE FOLLOWING

HVAC SYSTEM COMPONENTS
 CONTROL PANEL (VCS #70-08436)
 PLENUM (VCS #70-07870)
 AC-HEATER (VCS #70-08818)

NOTES:

- 1) INTERFACE CONNECTION FOR PANEL LIGHTS.
- 2) INTERFACE CONNECTION FOR POWER AND GROUND.
- 3) A/C REQUEST SIGNAL TO ENGINE CONTROL MODULE (UNDER-HOOD CONNECTION)
- 4) A/C REQUEST SIGNAL TO ENGINE CONTROL MODULE (UNDER-DASH CONNECTION)
- 5) MOST ELECTRICAL CONNECTORS ARE ILLUSTRATED FROM THE WIRE INSERTION SIDE AND ARE DRAWN TO APPROXIMATE THE CONNECTOR'S PHYSICAL SHAPE. THE EXCEPTIONS ARE THE 9-PIN AND 4-PIN CONNECTORS AT THE JUNCTION OF THE PLENUM WITH THE CONTROL PANEL AND THE AC-HEATER.



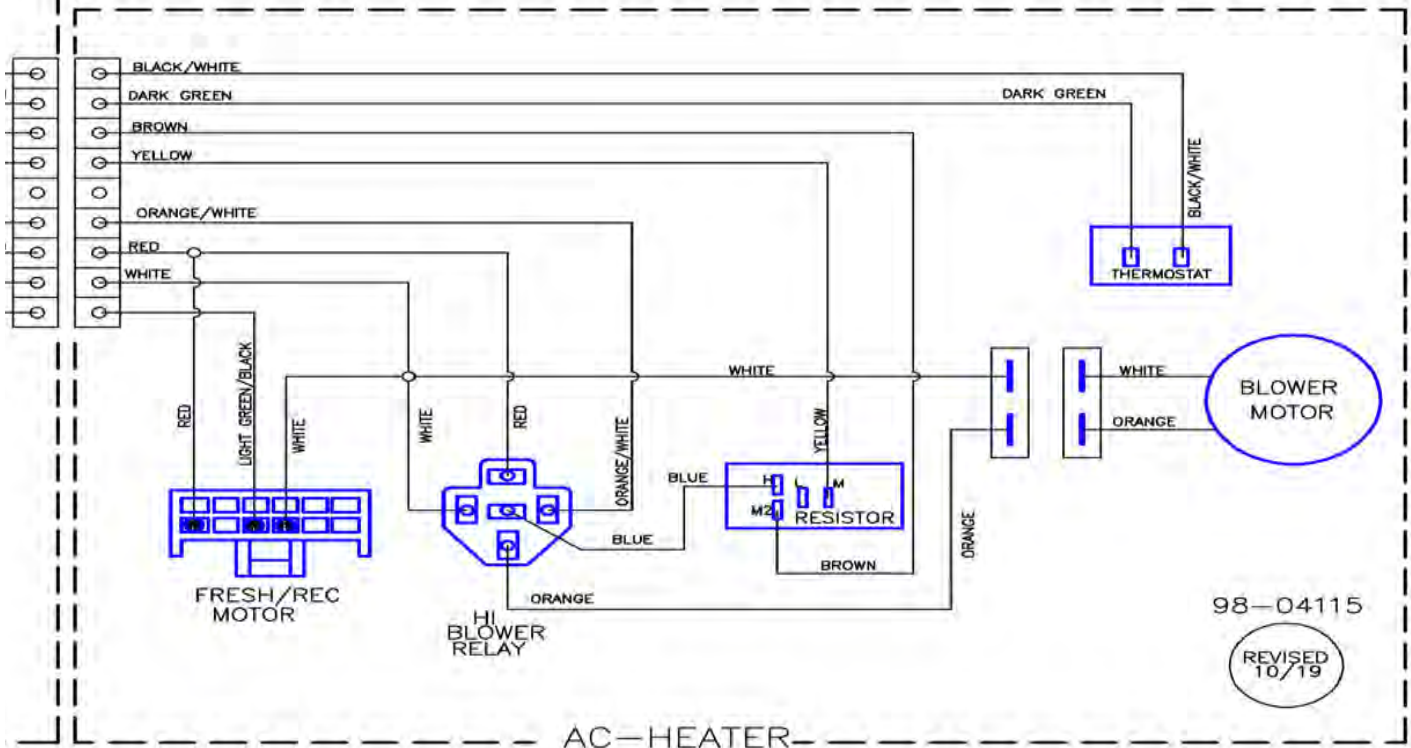
WIRING DIAGRAM (Enlargement 1 of 3)

WIRING DIAGRAM FOR THE FOLLOWING HVAC SYSTEM COMPONENTS

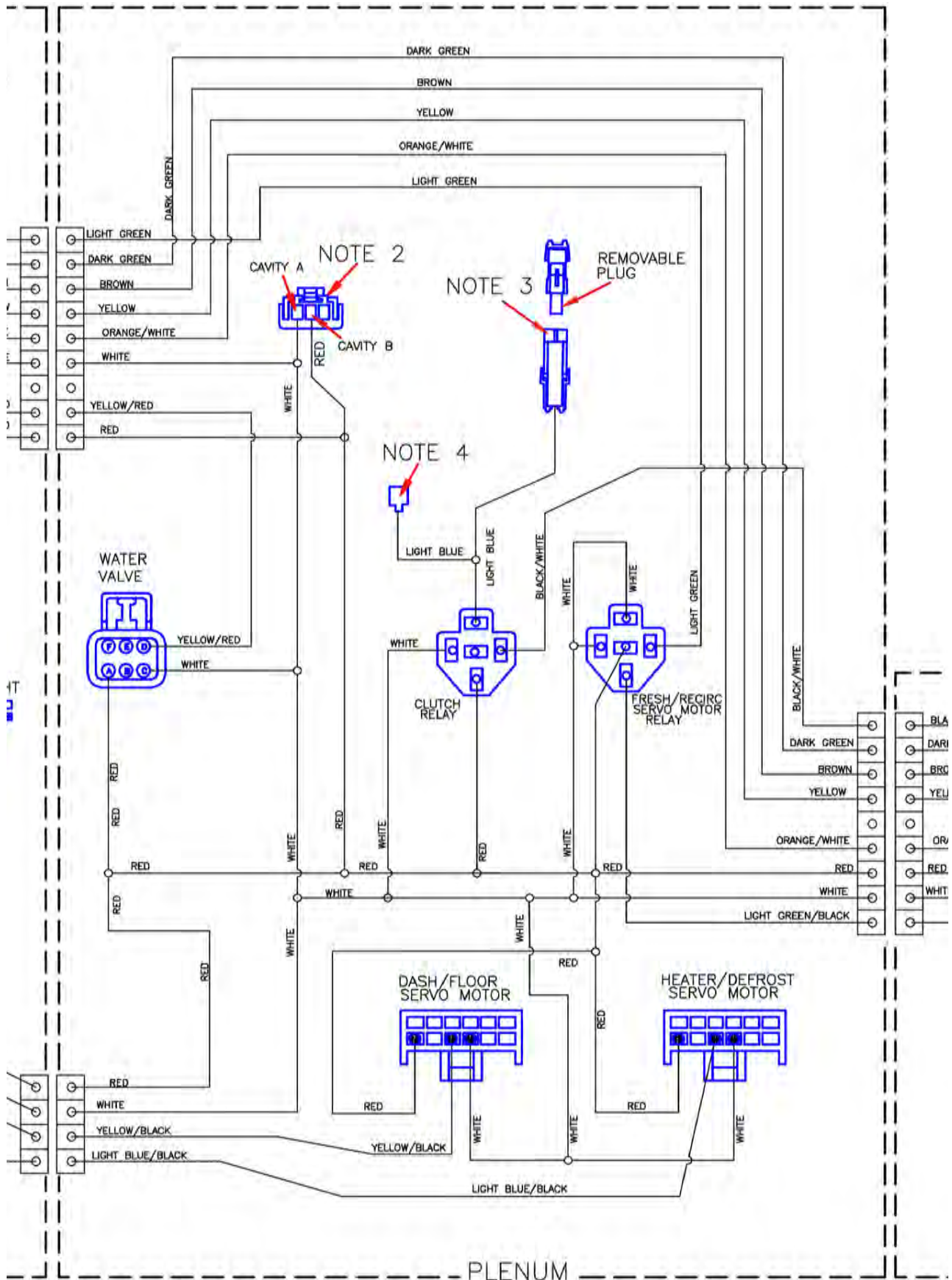
CONTROL PANEL	555001416	(VCS #70-08436)
PLENUM	555001321	(VCS #70-07870)
AC-HEATER	555001110	(VCS #70-08818)

NOTES:

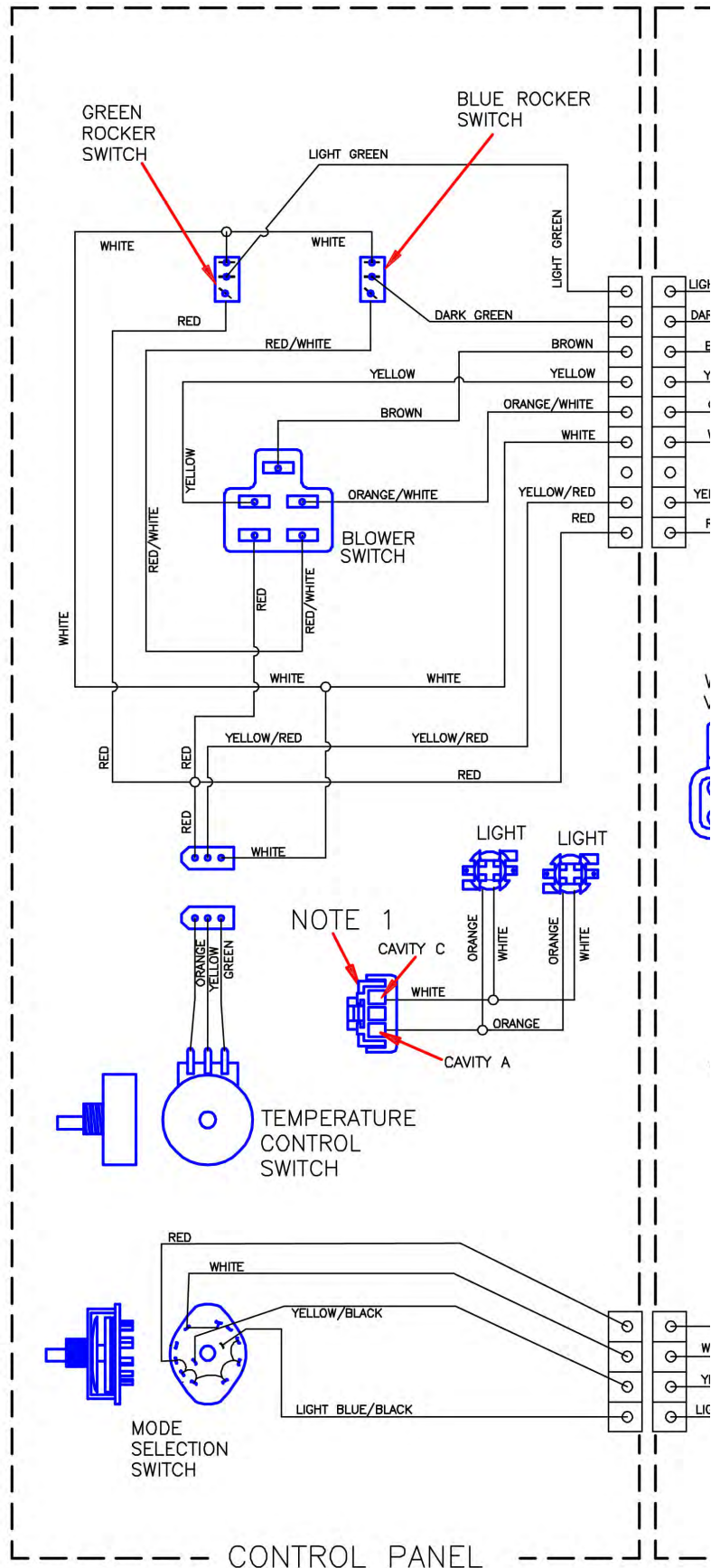
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WIRING DIAGRAM (Enlargement 2 of 3)



WIRING DIAGRAM (Enlargement 3 of 3)



TROUBLESHOOTING

SECTION A: AIRFLOW PROBLEMS

PROBLEM A-1, No air flow, blower does not operate

POSSIBLE CAUSE #1 - Faulty Blower Motor

CORRECTIVE ACTION - With ignition turned ON, unplug the 2-pin connector at the blower motor. Check the orange wire for +12 volts and the white wire for a fully grounded circuit. If power is present and the circuit grounded, remove the motor and wheel from the blower housing. Inspect for any evidence of entrapped debris or a broken blower wheel that might have prevented rotation. If no such evidence exists, replace the blower motor.

POSSIBLE CAUSE # 2 - Blown fuse due to short in wire harness.

CORRECTIVE ACTION

- Refer to the HVAC Wiring Diagram and the Chassis Manufacturer's wiring information.

Trace the entire HVAC wiring for an electrical short.

Replace or repair as required.

POSSIBLE CAUSE #3 - Defective Blower Switch.

CORRECTIVE ACTION - Refer to the **Blower Switch Continuity Diagram**

(Figure 1) and check the blower switch for continuity through the switch in all four switch positions.

Replace the blower switch as required.

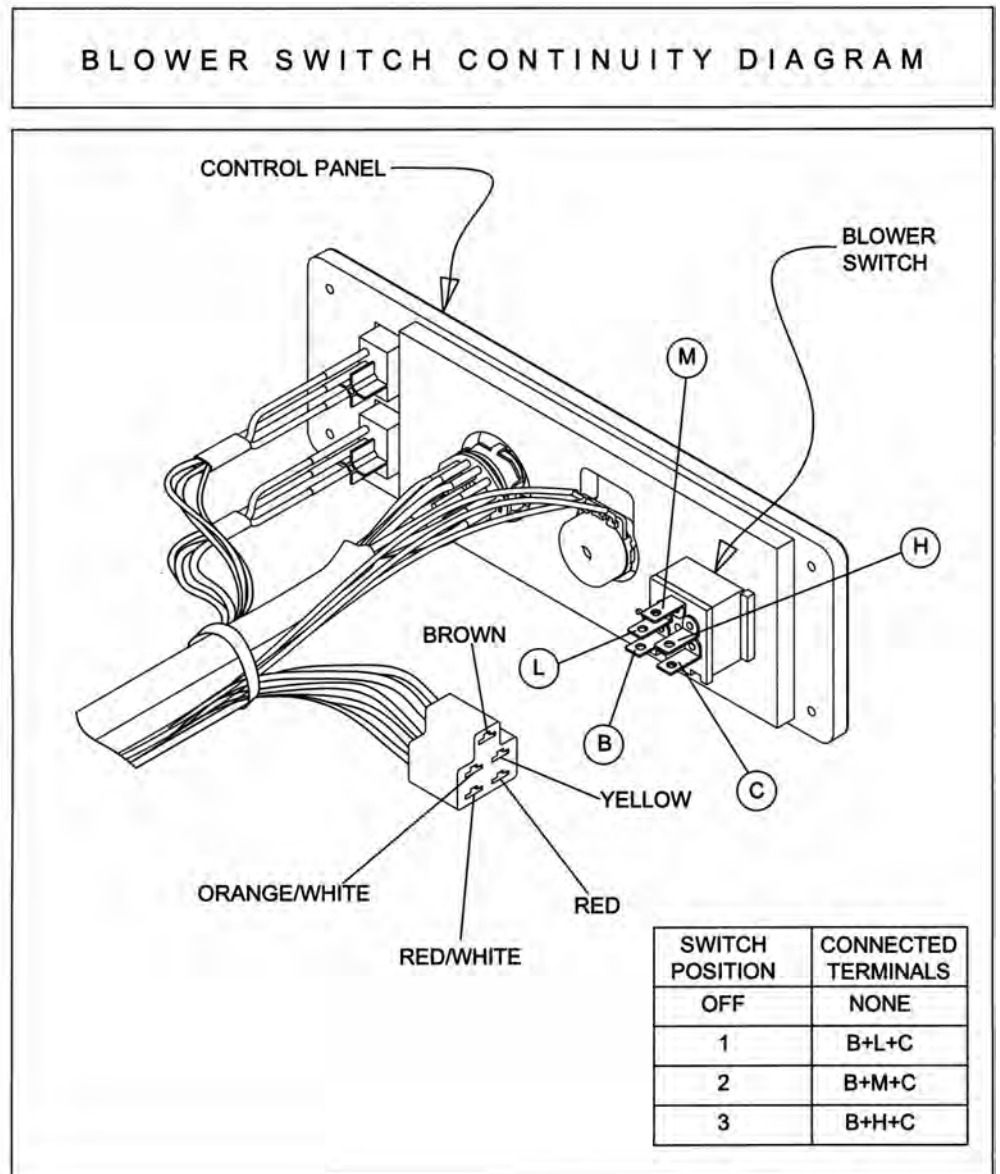
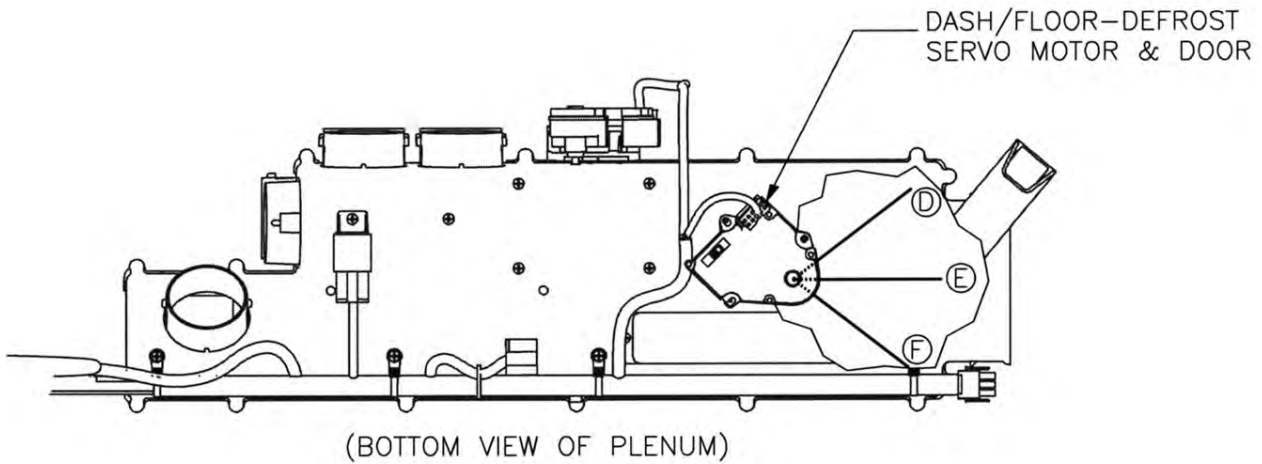
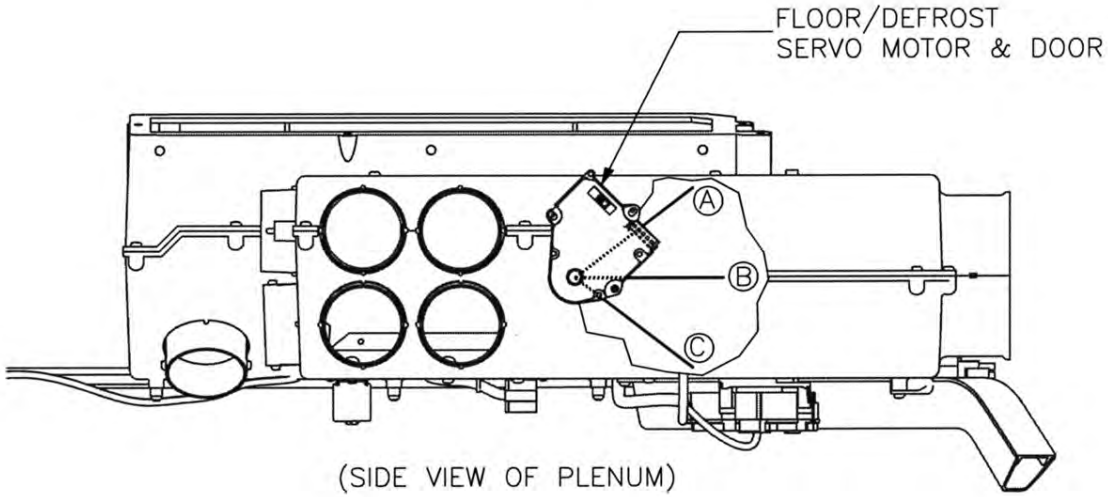


Figure 3

MODE SELECTION & SERVO MOTOR POSITION CORRELATION
DIAGRAM
AC-HEATER-DEFROSTER SYSTEMS



	SERVO MOTOR			AIR DISTRIBUTION
	FLOOR/DEFROST	DASH/FLOOR-DEFROST		
CONTROL PANEL MODE SELECTION		B	F	DASH LOUVERS
		A	E	DASH LOUVERS AND FLOOR
		A	D	FLOOR
		B	D	FLOOR AND WINDSHIELD
		C	D	WINDSHIELD

POSSIBLE CAUSE #2 - Servo motor failure

CORRECTIVE ACTION - If servo motor failure is suspected, the first step is to confirm that the electrical connections at the servo motors are fully connected to the servo motors (there is a possibility that they are not fully 'snapped' into motor's connector).

If the connection is viable, verify that the three-wire connector is delivering the correct signal to the motors. With the ignition switch turned to **Accessory**, unplug each of the servo connectors and test according to the information in the **Electrical Connection To Plenum Servo Motors** Diagram (Figure 4).

If the electrical check is in agreement with the **Diagram** and if the directional doors are not obstructed the likely problem is a failed servo motor.

Replace servo motor as required.

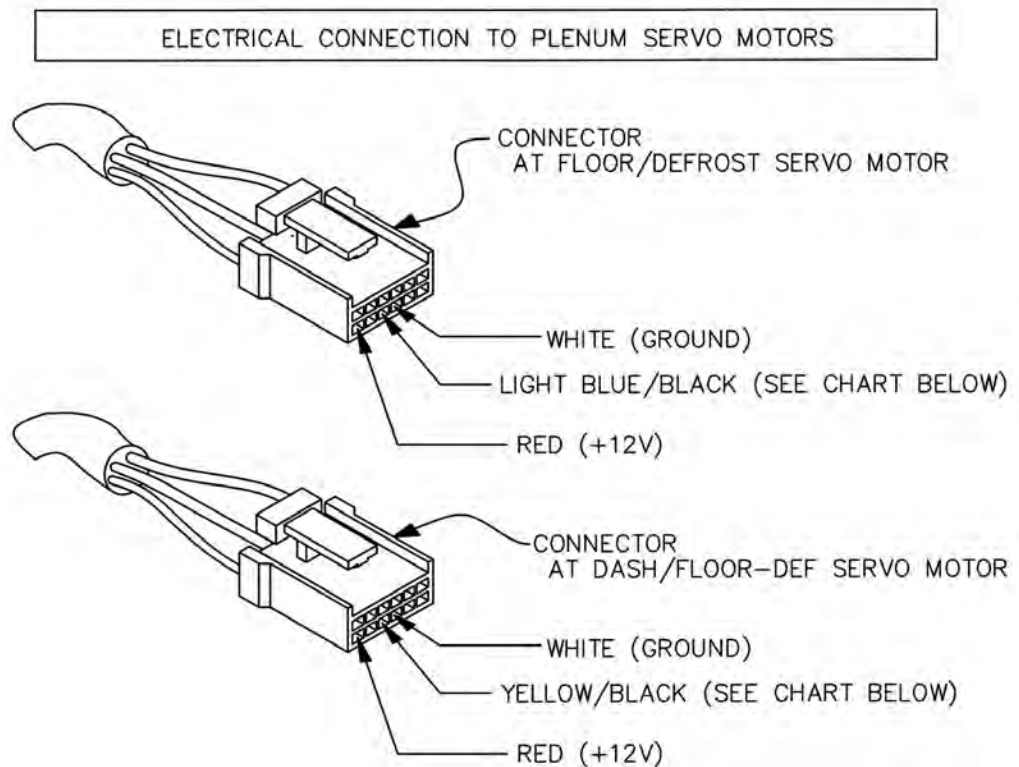


Figure 4

		SERVO MOTOR CONNECTOR	
		FLOOR/DEFROST LIGHT BLUE/BLACK WIRE	DASH/FLOOR-DEFROST YELLOW/BLACK WIRE
CONTROL PANEL MODE SELECTION		OPEN CIRCUIT	GROUND
		+12V	OPEN CIRCUIT
		+12V	+12V
		OPEN CIRCUIT	+12V
		GROUND	+12V

POSSIBLE CAUSE #3 - Control Panel Selector Switch is defective

CORRECTIVE ACTION - With the ignition turned to **Accessory**, unplug each of the connectors from the Plenum servo motors and test according to the information in the **Electrical Connection To Plenum Servo Motors Diagram** (Figure 5).

If the test fails to find agreement with the **Diagram**, there is a good possibility that the Mode Selection Switch at the control panel is defective.

Replace the Mode Selection Switch.

SECTION B: TEMPERATURE CONTROL PROBLEMS

PROBLEM B-1, Air temperature cannot be controlled

POSSIBLE CAUSE #1 - Water valve not operating

CORRECTIVE ACTION - Valve may not be receiving a signal from the control panel, or valve is defective. Disconnect the electrical connector from the valve. With the ignition switch turned to **Accessory**, check for the presence of 12 volts between the red wire (+12V) and the white wire (ground) as noted in the **Water Valve Electrical Diagram**. (Figure 5). The yellow/red signal wire will provide +12V (full cold position) dropping to zero volts (full hot position) as the temperature control knob is rotated clockwise. If the condition at the connector is in agreement with the **Diagram**, proceed as follows:

Step 1 Disconnect the water valve from the 5/8" heater hoses.

Step 2 Carefully inspect the four small terminal pins on the motor, make sure that they are not damaged.

Step 3 Reconnect the valve to the electrical connector.

Step 4 Rotate the Temperature Control Knob and watch for any response from the valve.

Step 5 If no valve rotation is observed, replace the valve.

WATER VALVE ELECTRICAL DIAGRAM

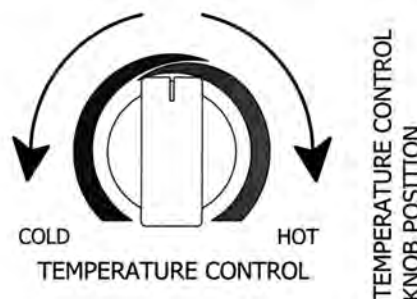
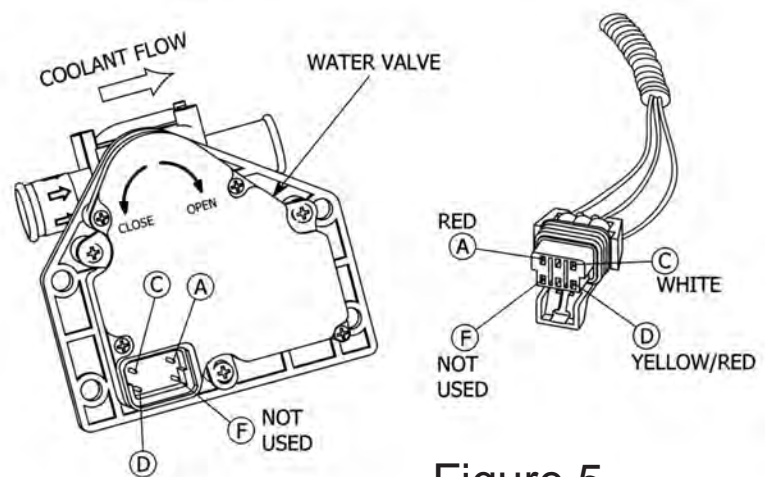


Figure 5

POSSIBLE CAUSE #2 - Water valve not electrically connected

CORRECTIVE ACTION - Disconnect the electrical connector from the valve. With the ignition switch turned to **Accessory**, check for the presence of 12 volts between the red wire (+12V) and the white wire (ground) as noted in the **Water Valve Electrical Diagram** (Figure 5). The yellow/red signal wire will provide +12V (full cold position) dropping to zero volts (full hot position) as the temperature control knob is rotated clockwise. If none of these conditions exist, refer to the **Wiring Diagram** and examine the system's wire harness for any loss of continuity. Repair as required.

PROBLEM B-2, A/C system not providing cool air

POSSIBLE CAUSE #1 - Loss of refrigerant

CORRECTIVE ACTION - Verify the presence of 1.75 pounds of refrigerant R134a. If the A/C system is either low, or completely empty, a search will be required for leakage. Replace and repair as required.

POSSIBLE CAUSE #2 - Compressor clutch not engaged

CORRECTIVE ACTION - Confirm that the system is fully charged. With the ignition switch turned to **Accessory**, the blower switch turned to the highest speed and the A/C (blue) rocker switch engaged, proceed as follows:

Step 1 Check for the presence of 12 volts at the compressor. If yes, make certain that the compressor clutch is fully grounded. If the ground circuit is intact, the compressor clutch has, most likely, failed and requires replacement.

Step 2 If no voltage is present at the compressor clutch, refer to the **Wiring Diagram** and check for voltage at each of the system pressure switches. [**Note:** The low pressure switch is located on the suction hose near the firewall and opens on a pressure drop to 8 psi. The binary (high/low) pressure switch is located on the liquid hose near the receiver/drier and opens on a pressure rise to approximately 400 psi or a pressure drop to 28 psi.] With the system fully charged, there should be continuity through both switches. Replace pressure switches as required.

Step 3 If no voltage is present at the pressure switches, check for voltage at the thermostat (located externally on the HVAC housing). Assuming that the evaporator coil is fully warmed to ambient conditions, the thermostat should be a closed circuit. [**Note:** The thermostat circuit opens when the evaporator coil surface temperature drops below 32 degrees F; this action prevents the accumulation of ice on the evaporator coil surface.] If the thermostat presents an open circuit, replacement is required. Thermostat replacement requires the complete removal and disassembly of the HVAC housing. When replacing thermostat, take special care to not kink the capillary tube. Also, install the new capillary tube into the coil's fin surface in the same location as the original.

POSSIBLE CAUSE #3 - Perceived lack of cooling due to extreme conditions

CORRECTIVE ACTION - Note that extremely high humidity can reduce the effectiveness of the evaporator. The **Ambient Temperature vs. Relative Humidity** chart (Figure 6) illustrates how very high humidity can raise the louver temperatures. This test is best performed with the doors and windows open, the blower turned to the highest speed and the A/C system fully engaged. Run the engine at 1500 rpm and allow time for the system to stabilize. Measure the discharge air temperature at one of the dash louvers and compare to the data on Figure 6.

Ambient Temperature vs. Relative Humidity

		AMBIENT TEMPERATURE				
		60	70	80	90	100
RELATIVE HUMIDITY	10%	*	*	38	48	58
	20%	*	*	39	49	59
	30%	*	*	45	49	63
	40%	*	39	48	53	68
	50%	*	42	53	57	73
	60%	*	46	57	60	79
	70%	*	49	61	67	82
	80%	39	52	64	71	85
	90%	42	55	68	74	88
	100%	46	57	71	77	90

* VALUES IN THE SHADED AREA SUBJECT TO FLUCTUATION DUE TO CYCLING OF THE COMPRESSOR

Figure 6

Typical louver temperatures as influenced by the combination of Ambient Temperature and Relative Humidity

SECTION C: DIAGNOSIS OF REFRIGERANT RELATED PROBLEMS

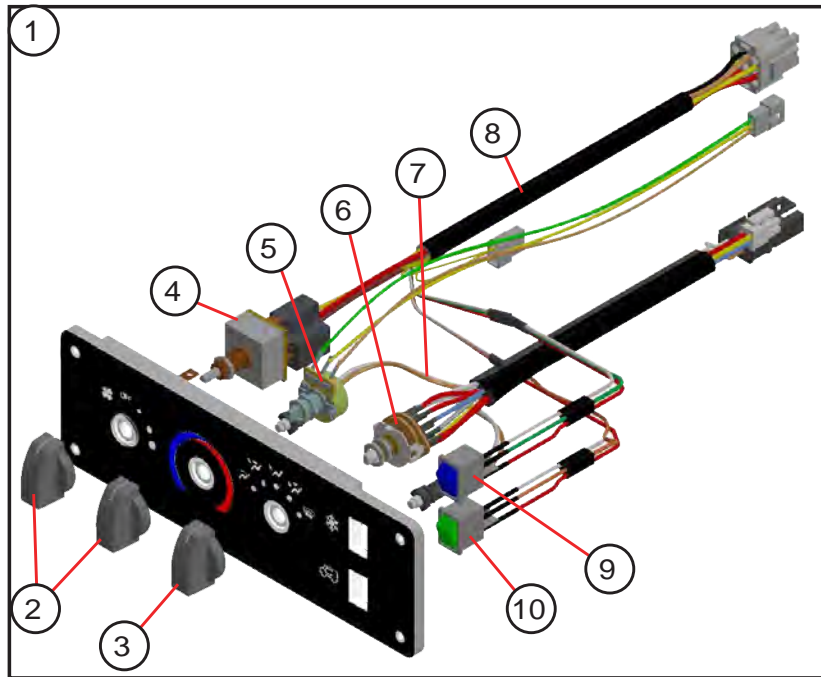
Consult the following **Refrigerant System Evaluation** chart (Figure 7) for a list of refrigerant related symptoms and their recommended resolution:

Refrigerant System Evaluation
Figure 7

SYMPTOM	LOW-SIDE GAUGE	HIGH-SIDE GAUGE	DIAGNOSIS	CORRECTION
AIR SLIGHTLY COOL	NORMAL	NORMAL	AIR & MOISTURE IN SYSTEM	REPLACE RECEIVER/DRIVER RECHARGE
SYSTEM OPERATED NORMALLY FOR A SHORT PERIOD, BUT AIR WARMS AS LOW SIDE DROPS TO ZERO	INITIALLY NORMAL	INITIALLY NORMAL	EXCESS MOISTURE IN SYSTEM TURNING TO ICE WITHIN EXPANSION VALVE	REPLACE RECEIVER/DRIER, RECHARGE
SYSTEM OPERATED NORMALLY, BUT AIR FLOW GRADUALLY DECREASES	INITIALLY NORMAL, BUT DROPS AS AIR FLOW DECREASES	NORMAL, BUT DROPS AS AIR FLOW DROPS	THERMOSTAT FAILURE ALLOWING SURFACE OF EVAPORATOR COIL TO FREEZE	REPLACE THERMOSTAT
POOR COOLING	LOW	LOW	LOW REFRIGERANT CHARGE	REPAIR SYSTEM LEAKS, RECHARGE
POOR COOLING, ICE FORMING ON SURFACE OF EXPANSION VALVE	LOW	LOW	EXPANSION VALVE STUCK IN CLOSED POSITION	REPLACE EXPANSION VALVE, RECHARGE
POOR COOLING, SWEATING MAY APPEAR ON HIGH-SIDE COMPONENTS	LOW	LOW	RESTRICTED REFRIGERANT FLOW ON HIGH SIDE	REPAIR/REPLACE DEFECTIVE HIGH SIDE COMPONENTS, RECHARGE
POOR COOLING NOISY COMPRESSOR	LOW	LOW	COMPRESSOR MALFUNCTION	REPLACE COMPRESSOR RECHARGE
POOR COOLING HIGH SIDE LINES HOT	HIGH	HIGH	SYSTEM OVER CHARGE	RECHARGE SYSTEM (1.75 #R134A)
POOR COOLING HIGH SIDE LINES HOT	HIGH	HIGH	POOR CONDENSING	INSPECT CONDENSER FOR OBSTRUCTIONS THAT COULD REDUCE AIR FLOW
POOR COOLING	HIGH	HIGH	EXPANSION VALVE STUCK OPEN	REPLACE EXPANSION VALVE, RECHARGE

SERVICE PARTS

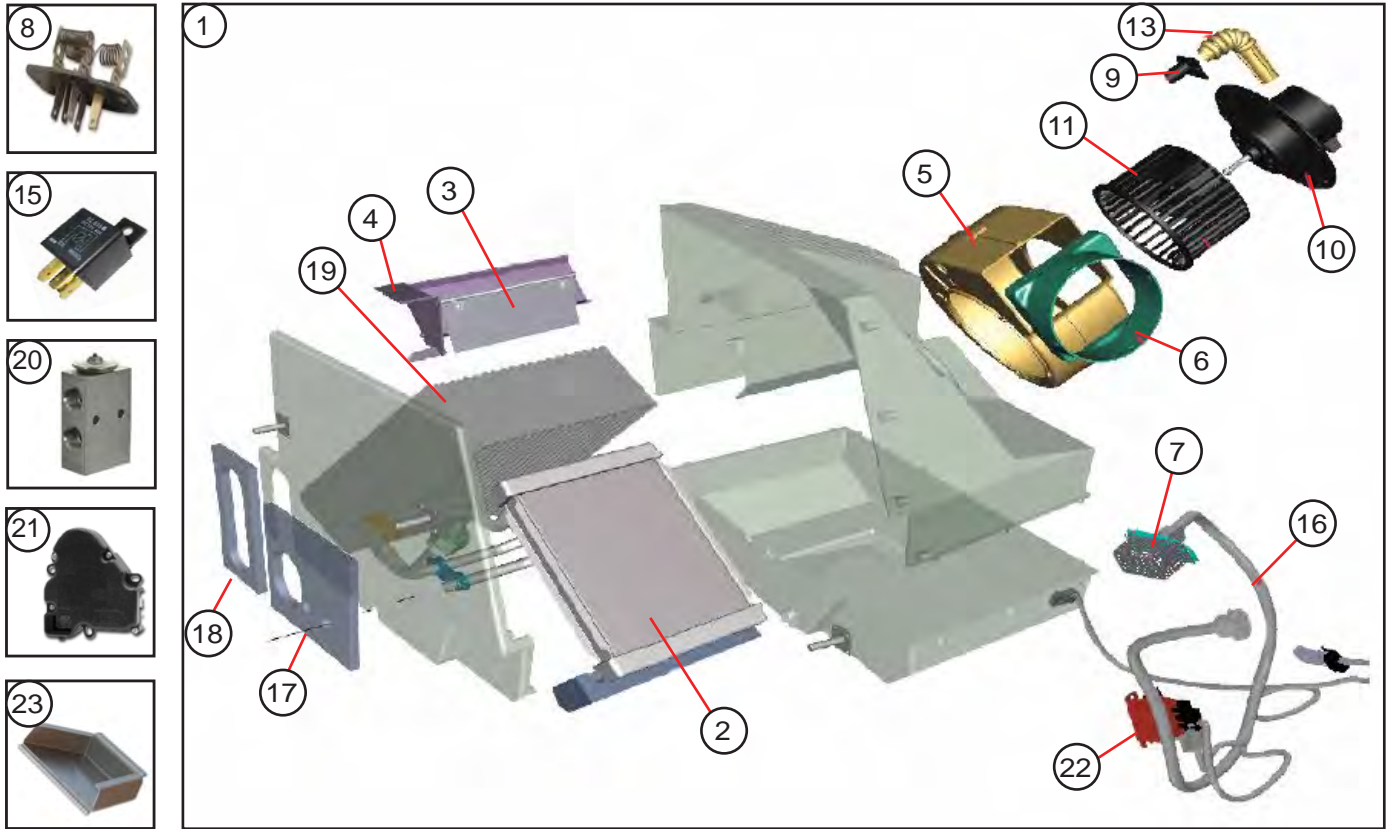
Control Panel



ITEM #	PART #	DESCRIPTION	QTY	UNIT
1	555001416	CONTROL PANEL ASSEMBLY	1	EA
2	47008706	KNOB	2	EA
3	47008777	KNOB - MODE SELECTOR SWITCH	1	EA
4	46023202	SWITCH - BLOWER SPEED	1	EA
5	47008710	SWITCH - TEMPERATURE CONTROL	1	EA
6	47008774	SWITCH - MODE SELECTOR	1	EA
7	47008711	HARNESS ILLUMINATION	1	EA
8	47008778	HARNESS	1	EA
9	47008775	ROCKER SWITCH BLUE	1	EA
10	47008776	ROCKER SWITCH GREEN	1	EA

SERVICE PARTS

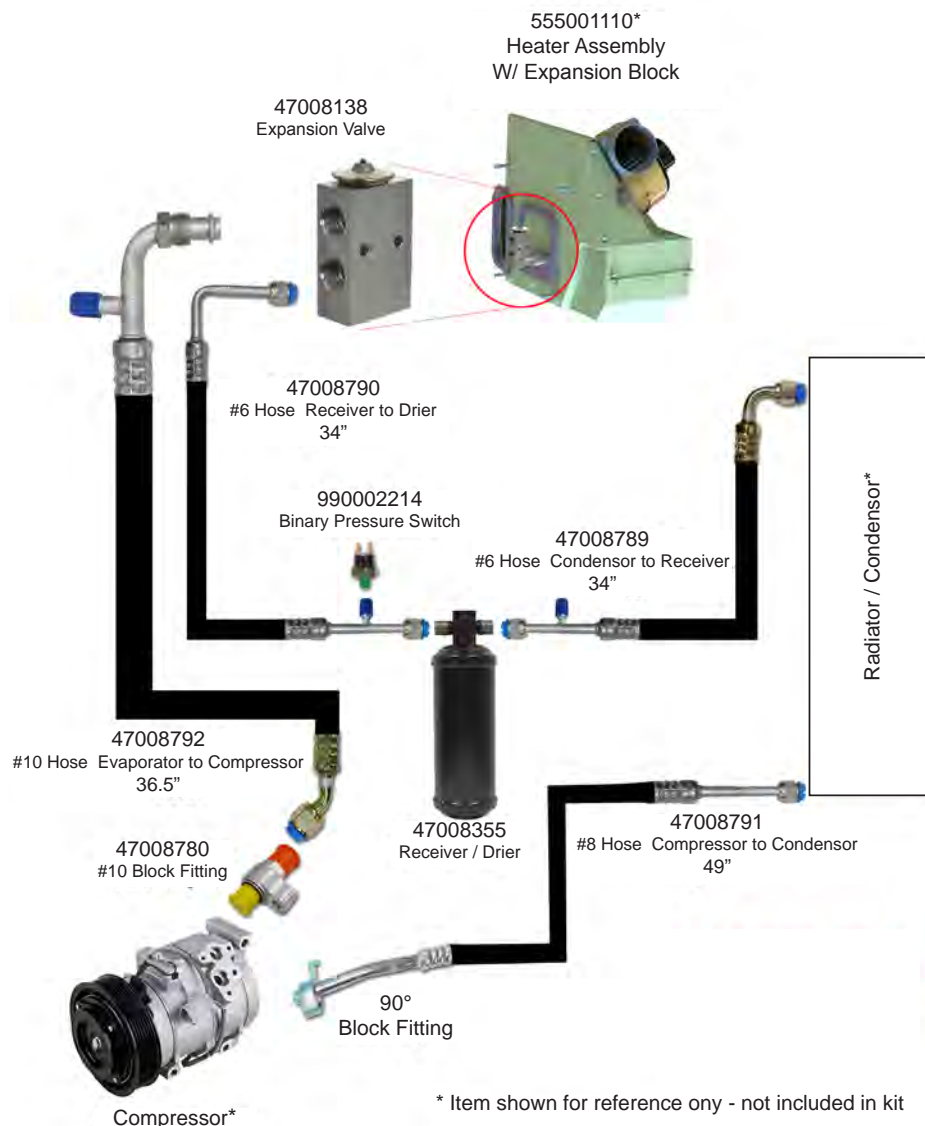
A/C-Heater



ITEM #	PART #	DESCRIPTION	QTY	UNIT
1	555001110	HEATER ASSEMBLY	1	EA
2	47008760	HEATER COIL WITH GASKETS / CLAMP	1	EA
3	Call	DOOR	1	EA
4	Call	A/C PARTITION	1	EA
5	47008754	BLOWER HOUSING	1	EA
6	Call	BLOWER ADAPTER	1	EA
7	47008732	RESISTOR CAGE	1	EA
8	47008357	RESISTOR	1	EA
9	47008731	VENT TUBE ADAPTOR	1	EA
10	46032339	BLOWER MOTOR	1	EA
11	47008769	BLOWER WHEEL	1	EA
12	Call	CLIP, BLOWER MOTOR SHAFT	1	EA
13	47008730	VENT TUBE	1	EA
15	47008716	RELAY	1	EA
16	47008768	HARNESS	1	EA
17	Call	GASKET	1	EA
18	Call	GASKET	1	EA
19	47008763	EVAPORATOR COIL ASSEMBLY	1	EA
20	47008138	EXPANSION VALVE	1	EA
21	47008705	ACTUATOR MOTOR	1	EA
22	47008615	THERMOSTAT	1	EA
23	197080500	BRACKET - AIR INTAKE	1	EA
NS	555002056	WATER VALVE	1	EA

SERVICE PARTS

(Under-hood items for models with FCCC chassis)



ITEM #	PART #	DESCRIPTION
1	47008789	#6 HOSE ASSEMBLY (CONDENSER TO RECEIVER)
2	47008790	#6 HOSE ASSEMBLY (RECEIVER TO EVAPORATOR)
3	47008791	#8 HOSE ASSEMBLY (COMPRESSOR TO CONDENSOR)
4	47008792	#10 HOSE ASSEMBLY (EVAPORATOR TO COMPRESSOR)
5	47008355	RECEIVER / DRIER
6	990002211	BRACKET RECEIVER / DRIER
7	Call	HARNESS JUMPER WIRE
8	Call	WIRE HARNESS - PRESSURE SWITCH JUMPER
9	990002214	BINARY PRESSURE SWITCH
10	47008716	RELAY
11	47008780	BLOCK FITTING #10 (COMPRESSOR)
NS	990002217	#6 O-RING
NS	47008153	#8 O-RING
NS	990002218	#10 O-RING
NS	990002216	LABEL, REFRIGERANT

HOOD

Hood Removal:

1. For removal of the gas springs. See page 28.
2. Disconnect wire harness plug connections.
3. Remove the 4 bolts tying the left and right hinge assemblies to the body of the truck.
4. Disconnect hood prop.
5. At this point the hood can be removed.

Hood Installation:

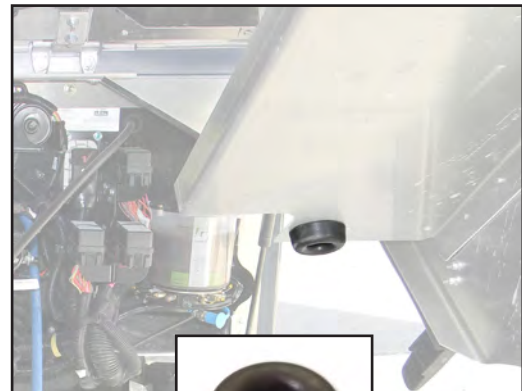
1. Before installation fasten hinge assemblies to hood assembly. Now using the original 4 fasteners install the completed assembly.
2. For installation of the gas springs, see page 28.
3. Reconnect all wiring.
4. Reconnect hood prop.

Hinge Replacement:

1. To replace hood hinge, remove three bolts attached to hood assembly.
2. Remove two bolts attached to windshield rail.
3. Slide hinge out to the side of the truck.
4. To replace hinge, install in reverse order.

Hood Stop Adjustment:

1. The stops that support the hood should be adjusted if the hood ever comes into contact with the cab skirts. The stop bracket is slotted to allow for vertical adjustment. Adjust brackets so that hood seats evenly and does not come into contact with cab skirts.



LAMPS

Headlight Replacement:

1. Remove screws and trim ring from around headlight.
2. Remove headlight.
3. Remove wiring plug from back of headlight.
4. Replace headlight.
5. For installation reverse removal sequence.

Tail, Turn Backup and Marker Lamp Replacement:

1. Push tail, turn back-up lamp into rubber grommet and use a small flat head screw driver and pry lamp from rubber grommet.
2. Remove wiring plug from back of lamp.
3. Install new lamp by reconnecting wiring plug to new lamp and pushing lamp into rubber grommet until properly seated.

** Apply a small amount of soapy water to grommet for ease of installation.*

Clearance Marker and ICC Light Replacement:

1. From inside, unplug the lamp, push lamp out of the grommet. To replace, from the outside push the lamp into grommet. Some lubrication helps installation. Install so the marking is towards the top. Hook up wiring taking care to match the polarity.



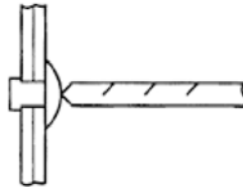
BODY PANEL REPLACEMENTS & RIVETS

Body Panel Replacement:

1. When replacing exterior body panels, remove rivets following procedures outlined below.
2. Apply sealant to new panel as required.
3. Install new panel in reverse order.

Removing A Rivet:

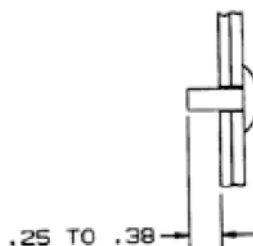
1. When removing an existing rivet, place the drill bit on the small dot in the center of the rivet head. Twist the drill chuck by hand to enlarge the small dot. This will prevent the drill from slipping.
2. *Never drill completely through the rivet or you risk enlarging the hole which can weaken the bond when re-fastened. Drill into the center of the rivet head. With drill turned off but still in place, move it horizontally and vertically until the head of the rivet comes off. Use an awl and a mallet to tap the rivet shank out.
3. If you accidentally drill through the material, see the following instructions.



Re-Riveting:

1. When replacing new panels, use .19 diameter rivets. The correct length rivet will measure .25-.38 beyond the material being joined. (See diagram below)
2. When ever rivets are removed there is always some enlargement to the hole. To ensure the strength of the new bond, follow these steps.
3. Drill the hole out to .25" diameter. If the hole is already .25" diameter then drill it out to .28" diameter and use a .25" bolt and nut, otherwise continue to the next step.
4. Rivet the parts using a .25" rivet. The correct length rivet will measure .25-.38 beyond the material being joined.

NOTE: As the vehicle ages, it is not uncommon for some rivets to loosen. This can often be detected by a black ring (aluminum oxide) around the head of the rivet. If this happens replace the rivet. See Re-Riveting.

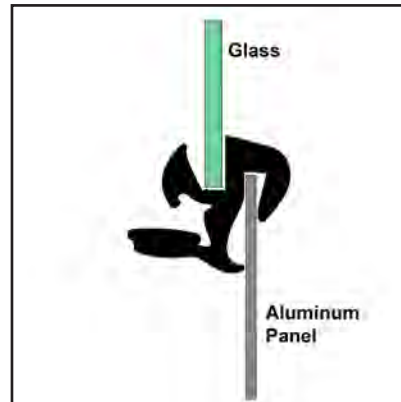
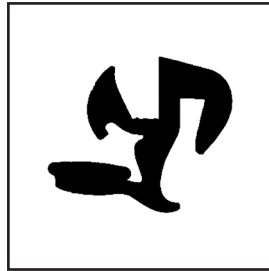


WINDSHIELD REPLACEMENT

Windshield Removal:

1. Special tools are required for windshield removal. Glass and Bead Tools.
2. A soap and water solution should be applied around the rubber seal. This will allow the tools to move smoothly when in contact with the rubber seal.
3. Using the glass tool pry between the windshield and the rubber seal. This will enable you to pry the glass from the seal. Leaving the tool in position work your way around the glass. Pushing the top corners of the windshield from inside the truck will get the removal process started.

NOTE: For safety reasons this task should be performed by two people.



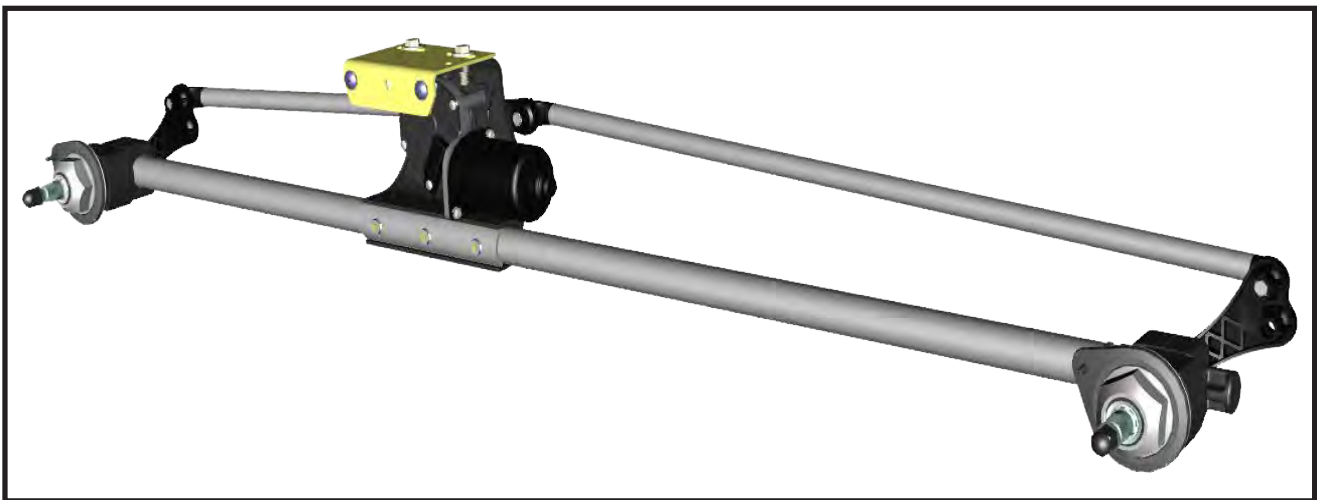
Windshield Installation:

1. Special tools are required for windshield removal. Glass and Bead Tools.
2. Insert rubber seal into window frame.
3. A soap and water solution should be applied around the rubber seal. This will allow the tools to move smoothly when in contact with the rubber seal.
4. Position the bottom of the windshield in place first. Using the glass tool pry the lip on the seal out to allow the windshield to seat in the seal properly. Work your way around the window until it is seated properly.
5. Do this around the whole windshield until the windshield seats properly in the frame.

WINDSHIELD WIPERS & MOTOR



Windshield Wipers and Wiper Drive Assembly:

1. Replace the wiper arm by removing the acorn nut and washer hose. To insure proper placement of the new wiper, mark the position of the old wiper arm before removing.
2. Reinstall in reverse order.



WINDSHIELD WIPER ASSEMBLY

Windshield Wipers and Wiper Drive Assembly:

1. From inside of cab, remove upper wiper cover and disconnect power to the wiper motor. Disconnect the washer hose from the pivot cover.
2. From the outside, remove the acorn retaining nuts, disconnect the washer hoses, remove the wiper arms. Remove the rubber boot, retaining nuts and pivot covers.
3. From the inside, unfasten the bolts from the mounting bracket, pull the pivot shafts away from the front panel and remove the assembly.
4. Remove the spacers from the pivot shafts to re use on the new wiper assembly if needed.
5. To install the new wiper assembly, position the spacers on the pivot shafts and position the assembly into place. Align the assembly so the pivot shafts protrude to the exterior.
6. From the outside, install the pivot covers and the retaining nut.
7. From the inside, install the bolts to the mounting bracket. Reconnect the washer hoses.
8.  Connect the power cable and cycle the wiper assembly to ensure it cycles properly and stops in the home position. Keep hands and tools clear of moving parts. 
9. From the outside, install the rubber boots, the wiper arms and acorn nuts, re attach the washer hose.
10. Check for proper operation.



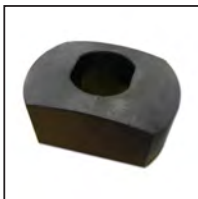
Acorn Nut P/N [81600189](#)
Tighten to 20 ft/LBS.



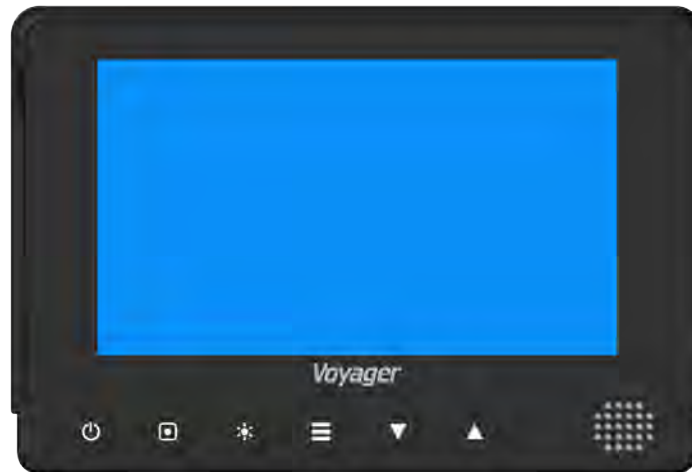
Retainer Nut P/N [47005901](#)
Tighten to 20 ft/LBS.



Pivot Cover P/N [47005902](#)



Spacer P/N [47005903](#)

UPSVOM718**7" COLOR TFT LCD 3 CAMERA MIRROR MONITOR****OWNER'S MANUAL****UPSVOM718 Features**

- High Performance Automotive Grade 7" Color LCD Panel
- 3 Video Inputs
- PAL/NTSC Compatible
- Mechanical Button
- Built-In Audio Speaker
- Compatible with Voyager Standard Camera

Camera-Monitor Warnings!

1. Camera/monitor system aids in the use of, but does not replace vehicle side/rear-view mirrors.
2. Objects in camera/monitor view are closer than they appear. When backing up, proceed cautiously and be prepared to stop.

360 CAMERA SYSTEM

UPSVOM718

Important! - Please Read This Manual Before Installing!

Congratulations on your purchase of a Voyager UPSVOM718 LCD Observation Monitor. With proper installation and use, your UPSVOM718 LCD is designed to provide you with years of trouble-free operation. Please read this manual thoroughly before beginning.

All Voyager Observation products are strictly intended to be installed as supplement aid to standard rear-view mirror systems that may already exist in your vehicle. Voyager Observation products are not intended for use as substitutes for-view mirror devices, or for any other standard motor vehicle equipment required to be installed on vehicles by law.

While Voyager observation products contribute to improving the vehicle operator's field of view, these products are no substitute for proper defensive driving techniques and observance of traffic laws and motor vehicle safety regulations.

Warnings!

RED POWER WIRE MUST BE CONNECTED TO ACCESSORY TO AVOID CURRENT DRAW IN THE KEY OFF POSITION.

Installation Location

It is unlawful in most jurisdictions for a person to drive a motor vehicle equipped with a television viewer or screen located at any point forward of the back of the driver's seat or in any location that is visible, directly or indirectly, to the driver while operating the vehicle. The UPSVOM718 product is designed to be used primarily as a rear observation device in conjunction with closed circuit camera. In any installations where the UPSVOM718 is used to display television broadcasts or recorded video, playback, installation location must adhere to local laws and regulations.

Tampering

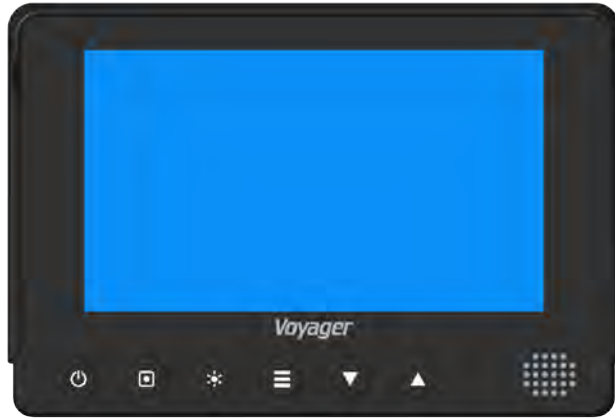
To prevent electrical shock, **DO NOT OPEN THE MONITOR CASE**. There are potentially harmful voltages inside the monitor. If evidence of tampering is detected, the warranty will be considered void and all parts will be non serviceable. There are no user serviceable parts inside the warranty will be considered void.

Moisture

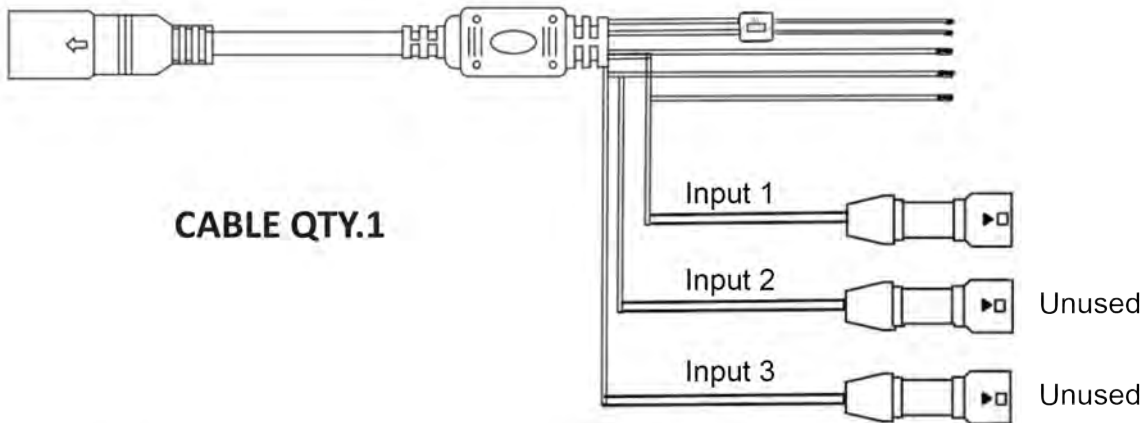
While it will withstand short periods of exposure to moisture, this product does contain sensitive electronic components and exposure should be limited by the user/installer. This product is not designed for locations where constant exposure to moisture or immersion can be encountered. This unit should NEVER be cleaned with a power washer or used where direct power washer spray may be encountered.

Depth of view

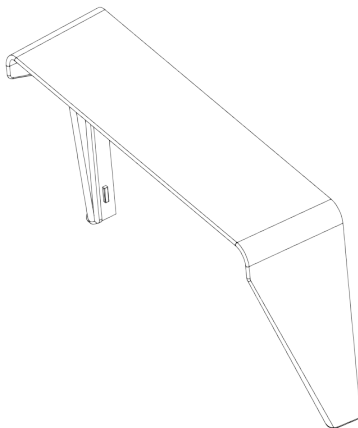
OBJECTS VIEWED ON MONITOR ARE CLOSER THAN THEY APPEAR.



LCD MONITOR QTY.1



CABLE QTY.1



SUNVISOR QTY. 1



MACHINE SCREW QTY.12 (M4X8mm)

360 CAMERA SYSTEM



Precaution

Power

1. Supply to DC9V~16V. Please confirm power voltage before using the kit.
2. Please unplug the unit when not using for longer period of time.

Safety

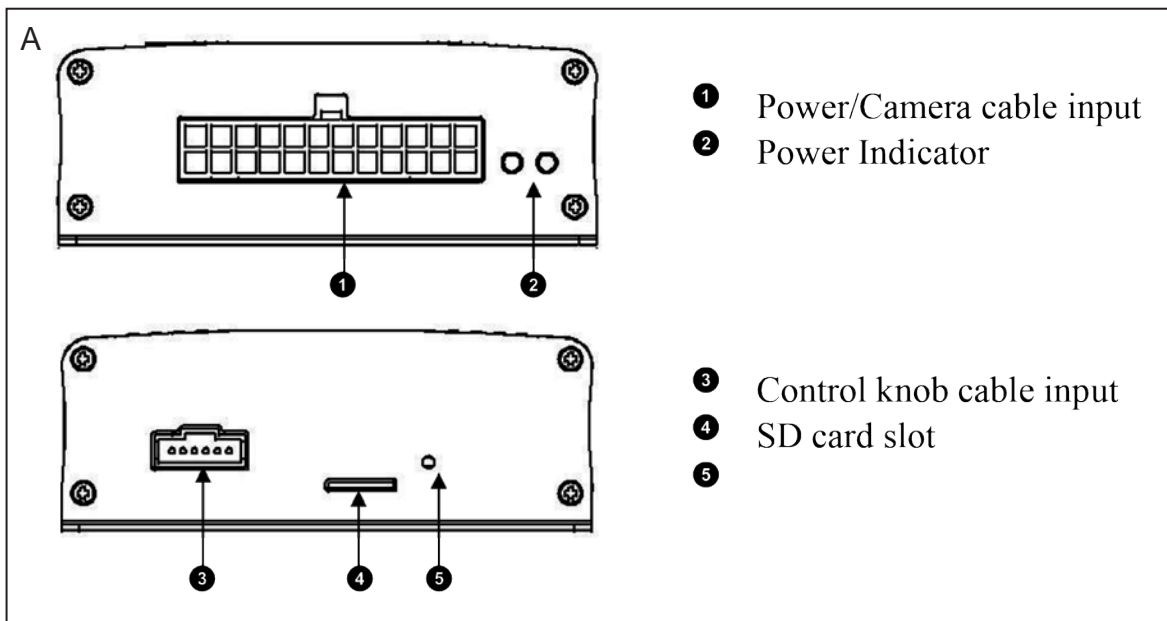
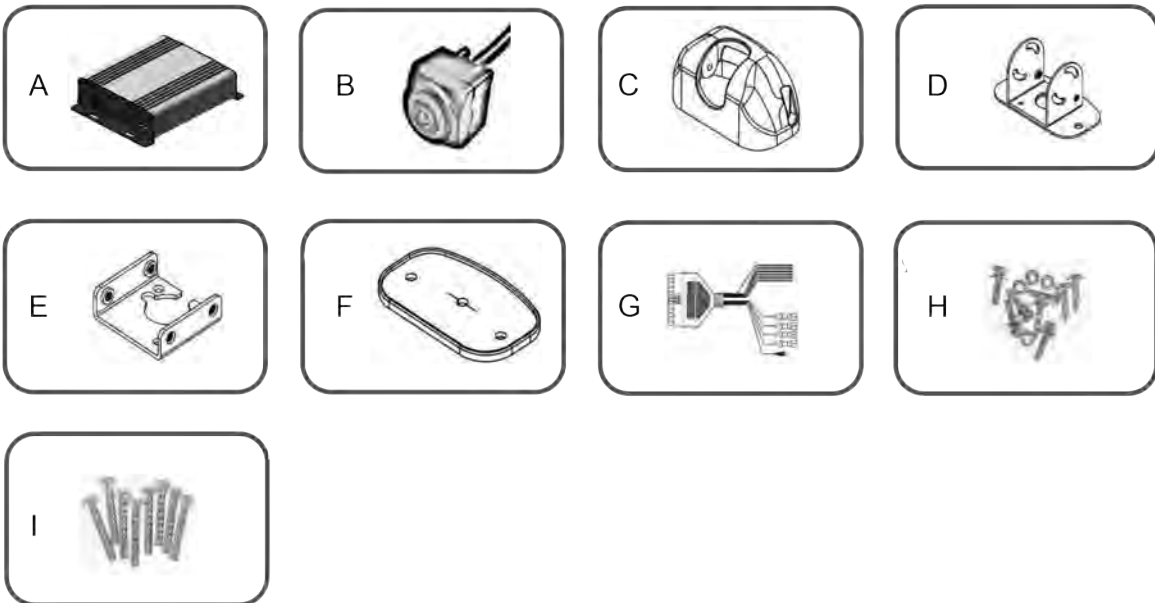
1. Avoid dust and high humidity.
2. Avoid strong dropping and impacting.
3. Make sure the product is not in direct sunlight.
4. If any liquid or solid materials enter machine, cut off the power immediately.
Please ask professional technicians to examine before reapply to power.
5. If any faults happened, please ask technicians to examine or contact with distributors.
Do not fix by your own.

Assemble

1. Please assemble the kit at airiness place to prevent the kit from overheated.
2. Keep the kit from radiators, exhausts area, downpour, over-dust, over-humid, strong magnetic field, for these will cause vibration or shock to the product.
3. Memory card is consumable item. The warranty is not guaranteed in case of image lost if memory card damaged.

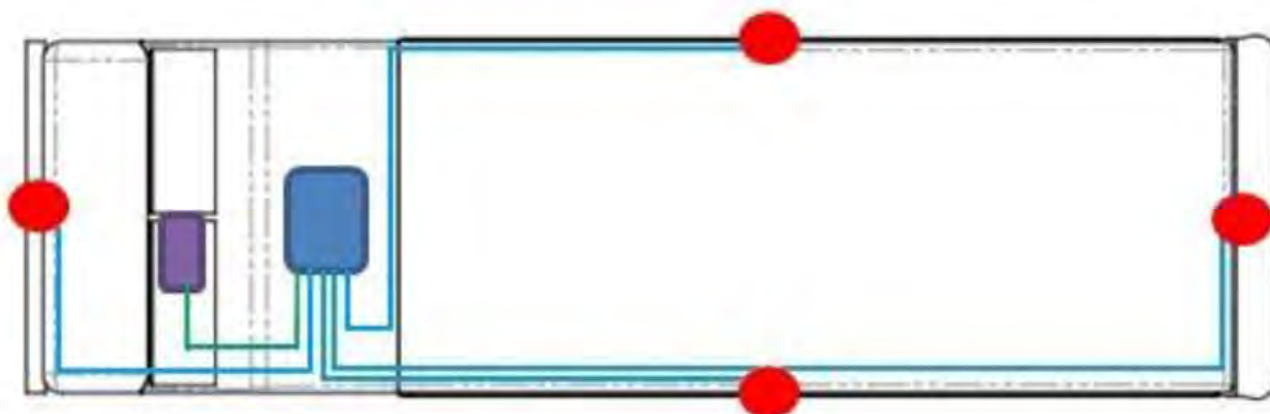
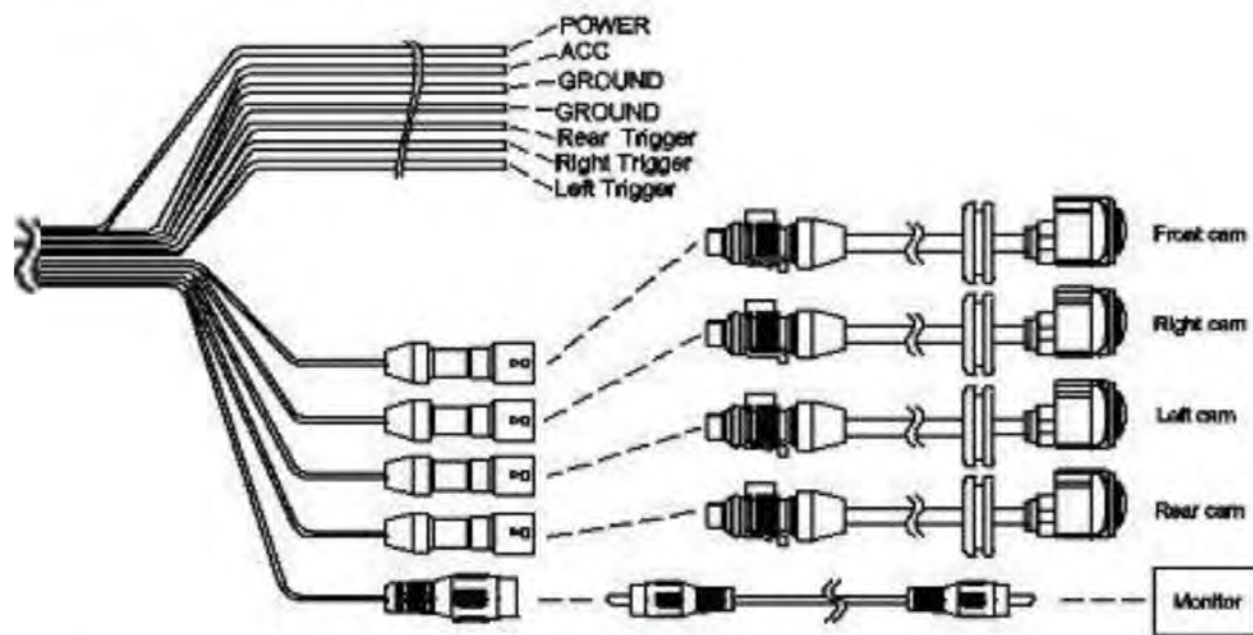
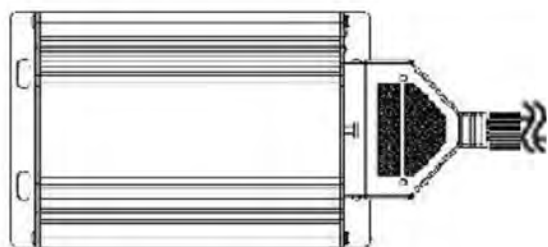
Content List

Description	Q'ty	Description	Q'ty
A VAVS100 Control Box	1	F Camera Rear seal	4
B Camera	4	G Power/Camera cable input	1
C Camera Housing	4	H Host Screw Pack	1
D Camera Bracket	4	I Camera Screw Pack	1
E Camera Bracket	4		



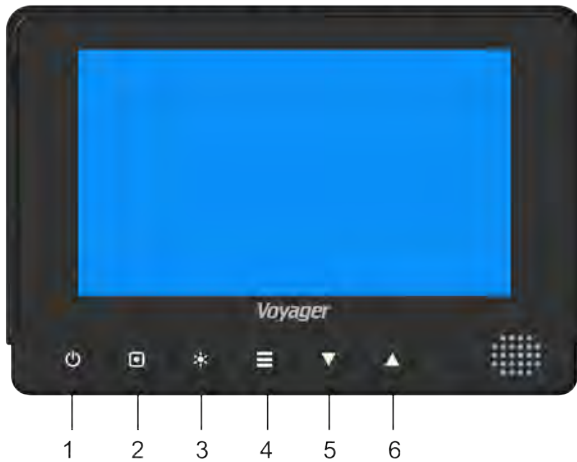
Wiring Diagram

System Connection



UPSVOM718

CONTROLS AND OPERATION



1, POWER ON/OFF



- Press once to turn on unit
- Press again to turn off unit

2, SELECT



Primary Function Input Source Select

- Press 'SELECT' button sequences source input modes from CH1 to CH3.

Secondary Function Menu Option Selection

- While in menu mode, the 'SELECT' button is used to select the highlighted function or option setting.

3, DIM



Switch between DAY & NIGHT mode

4, MENU



Primary Function Enter OSD

- Press 'MENU' button to enter the OSD

Secondary Function Return to previous menu

- While in menu modes, the 'MENU' button is used to return to previous menu.

5 & 6, UP/DOWN



Primary Function

- Pressing 'UP' button increase brightness, contrast, color, tint, volume .

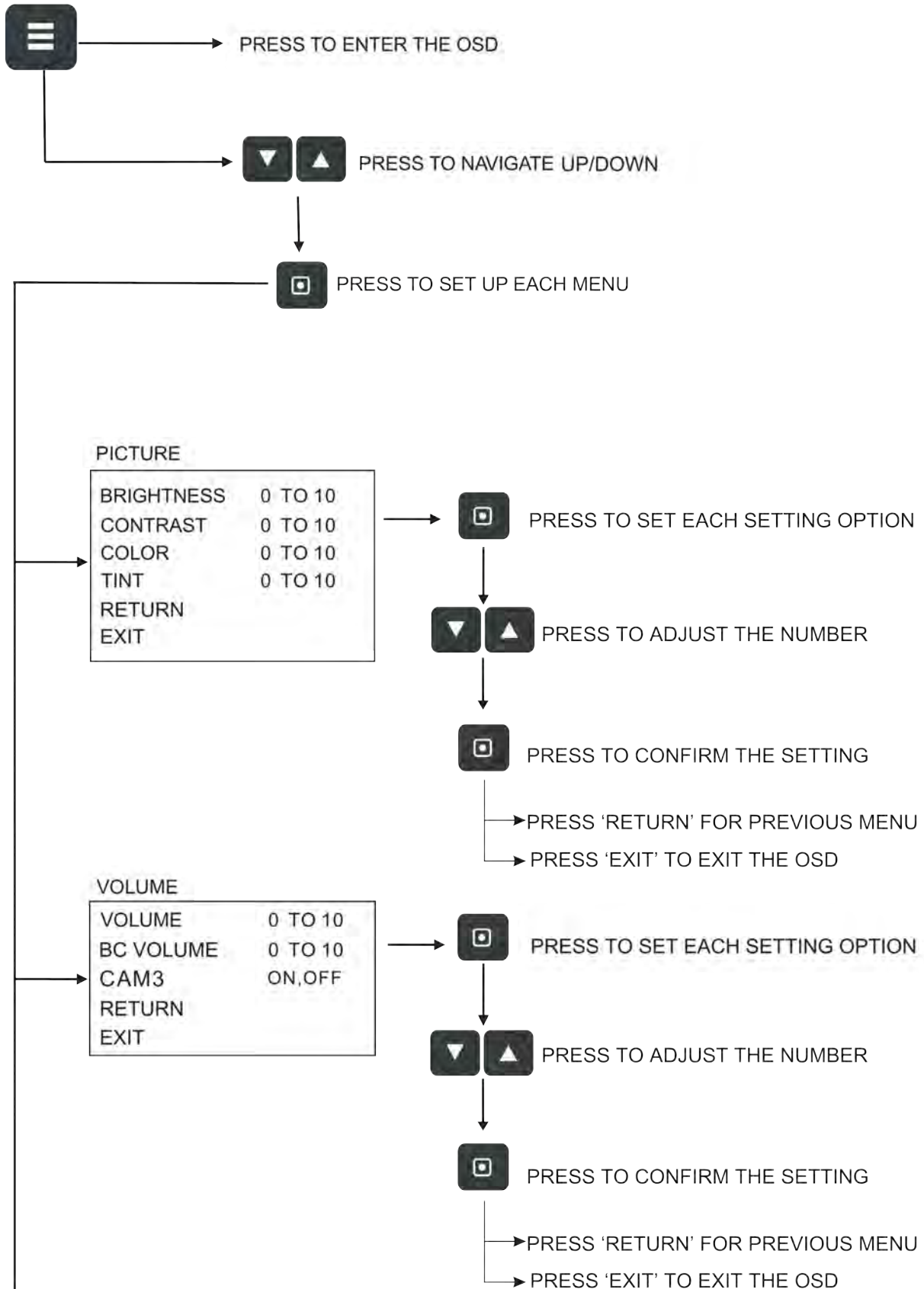
- Pressing 'DOWN' button decrease brightness, contrast, color, tint, volume.

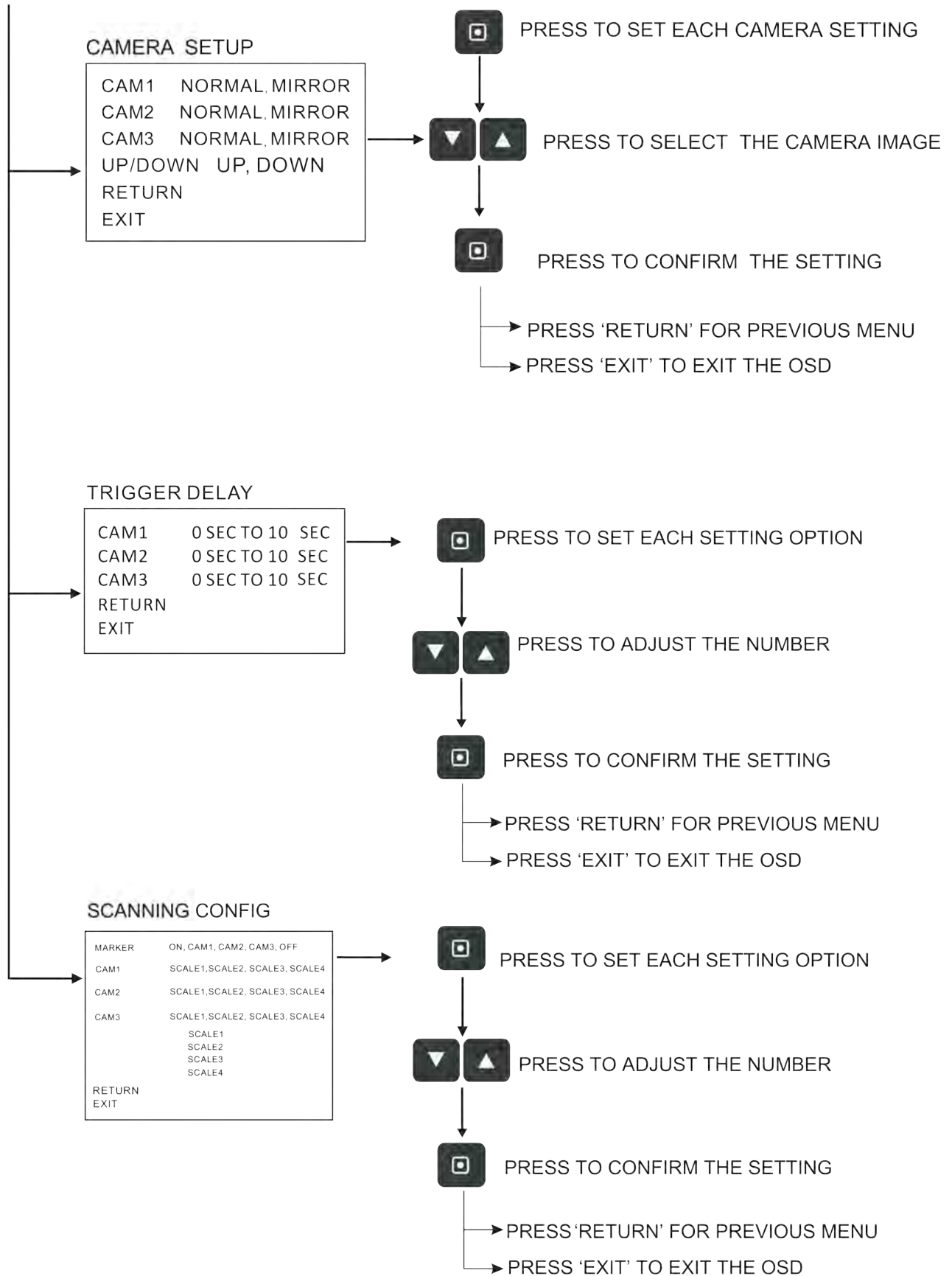
Secondary Function

- While in menu modes, the 'UP' 'DOWN' are used to select the option setting.

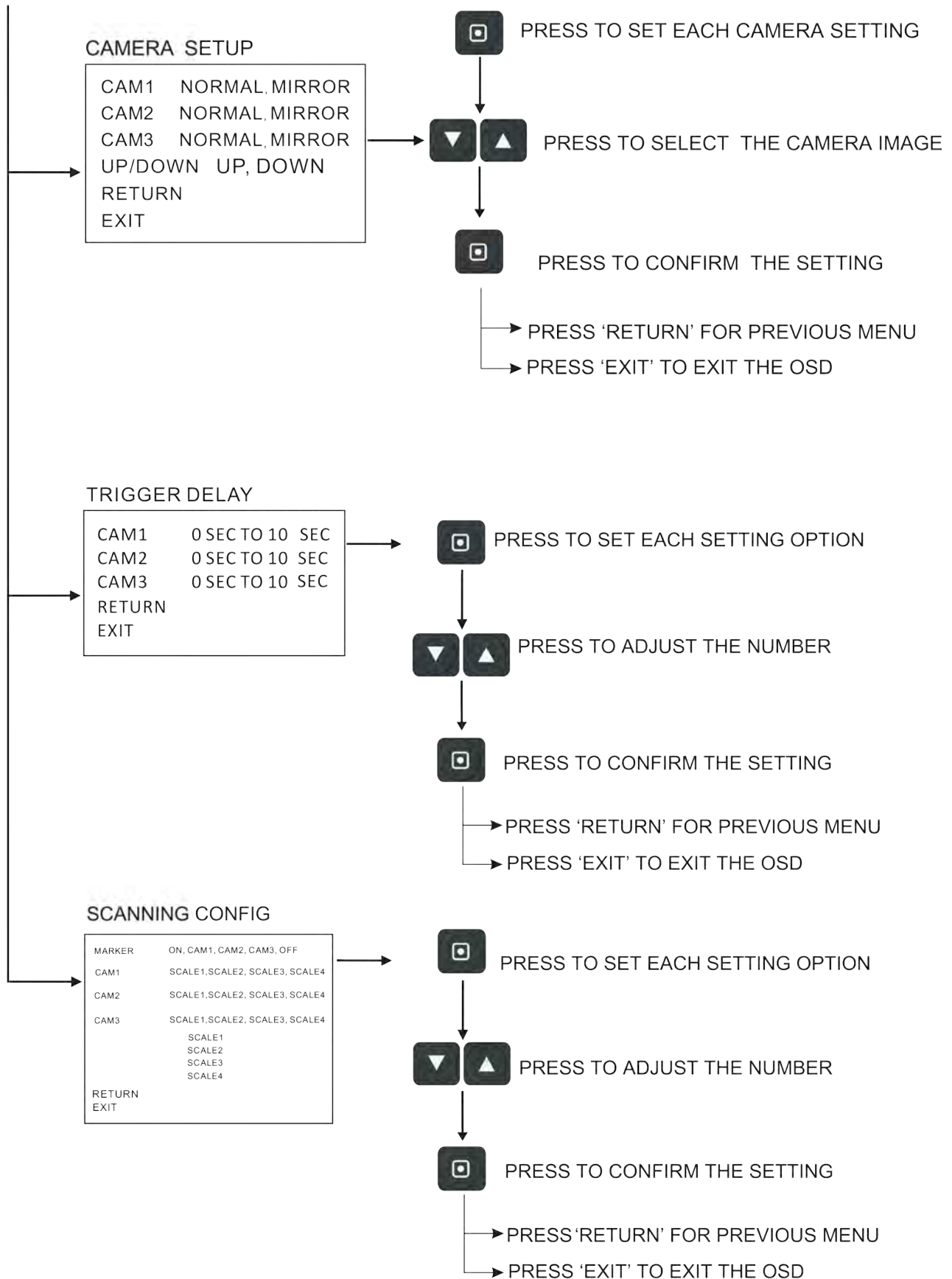
360 CAMERA SYSTEM

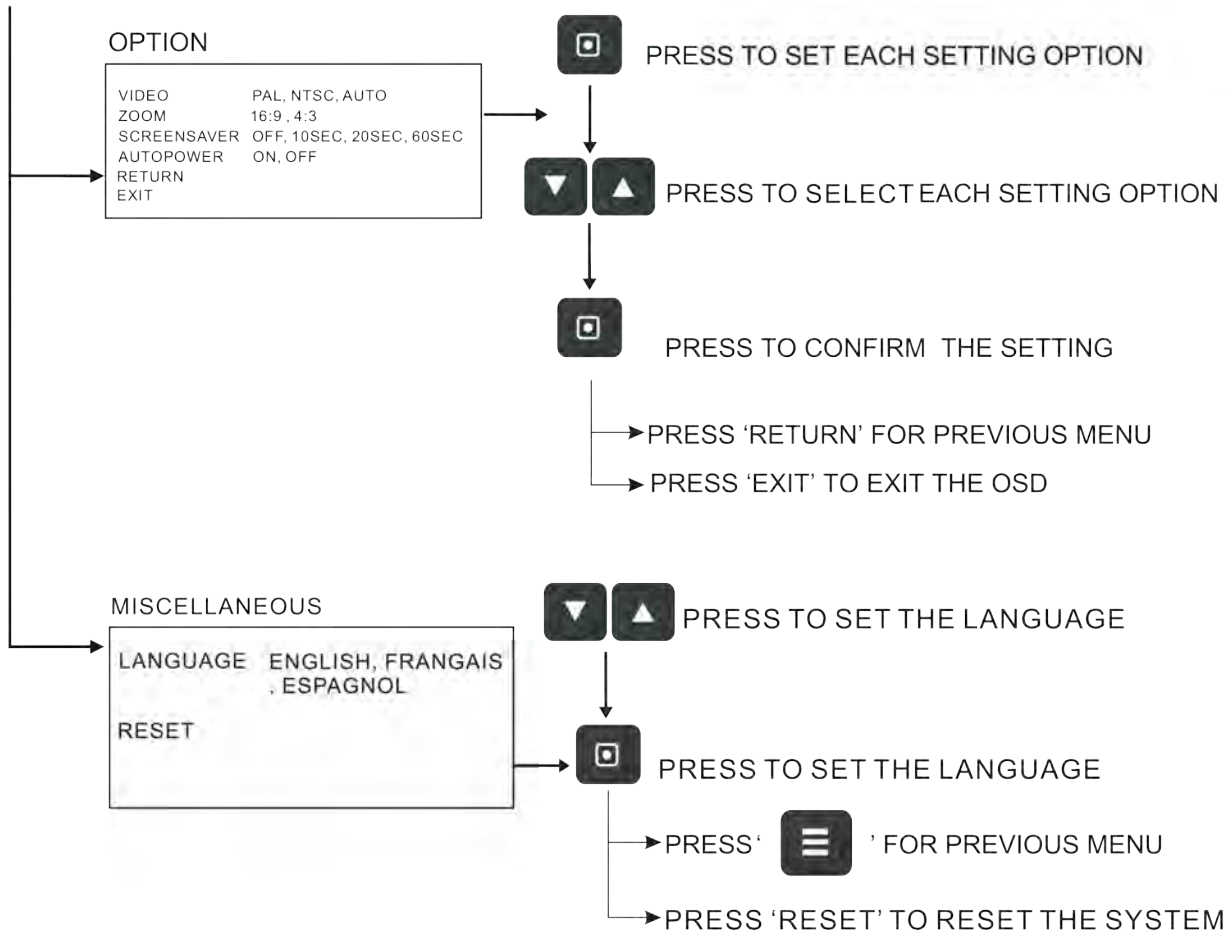
MENU





360 CAMERA SYSTEM





360 CAMERA SYSTEM

UPSVOM718

PRODUCT SPECIFICATIONS

LCD PANEL SPECIFICATIONS

Size/Type	7"(Digital) TFT LCD	
Brightness	400 cd/m' (typ)	
Contrast Ratio	500	
View Angles	Top (12 O'clock)	40° (typ)
(@CR≥10)	Bottom (6 O'clock)	60° (typ)
	Horizontal	60° (typ)
Response Time	10ms	
	20ms	
Back Light Type	LED	
Back Light Life	50,000 hrs (min)	

- ▣ **Operation Temperature Range** : -30° C ~ +85° C
- ▣ **Storage Temperature Range** : -30° C ~ +85° C
- ▣ **Max Humidity** : 85%
- ▣ **Operation Voltage Range** : DC12V~24V
- ▣ **Current Draw (typical)** : 337mA@12VDC
- ▣ **Signal system** : NTSC or PAL (Auto detection)
- ▣ **Video Aspect Ratio** : 16 : 9
- ▣ **Input Level**: 1Vp-p 75Ω
- ▣ **Audio Input Level** : 150mV(Max)
- ▣ **Product Dimensions** : 7.91W x 5.35H x 1.22D (Inches)
- ▣ **Product Weight** : 4.84 lbs/2200g

Symptom	Possible Condition	Solution
No Power	Poor Connection \ Fuse	Check Connections at power wires and ground wires.
		Check Vehicle fuse
		Check in-line fuse in the wire harness to monitor
		Check inline fuse in the wire harness to the signal processor
		In line fuses are located in the wiper compartment above the driver seat.
No image on the screen	Monitor signal cable is not connected	Check the video cable between the signal processor and the monitor
Fuzzy image	Dirt on the surface of the lense	Clean the camera lense with soft clean fabric
No function of left/ right/ reverse trigger	Trigger signal is not connected	Check the trigger wire connections

KEYLESS ENTRY

Bulkhead Door

1. Press and hold fob button for 1-second
2. Bulkhead door automatically opens and remains open until driver manually closes door
3. Door automatically latches and locks when door closes

Bulkhead Door Quick Open

1. After stopping the truck using the Engine Stop button
2. Within 5-seconds, press the Engine Stop button a 2nd time
3. Bulkhead door automatically opens and remains open until driver manually closes door
4. Door automatically latches and locks when door closes

Rear Door

1. Quickly double-tap fob button
2. Rear door unlocks for 8-seconds
3. During the 8-seconds, unlatch the rear door and manually open it
4. Rear door must be manually closed
5. Door automatically latches and locks when door closes

KEYLESS START & STOP

Standard Start

1. Tap fob button once
2. Back light on Engine Start / Stop switches begin flashing
This indicates that a Valid ID has been detected
3. Within 5-seconds, press the Engine Start button once to initiate truck start sequence
4. Press the Engine Start button a 2nd time to crank starter
5. Release Engine Start button when engine turns over.
Truck is now in 'Run' mode

Truck Did Not Crank on 1st Press

1 If truck did not start, the Engine Start button can be pressed again within 5-seconds of releasing the Engine Start button to try and re-crank the truck starter motor.

Truck Engine Stop

- 1 If engine is running AND truck is stopped, press the Engine Stop button
- 2 Truck engine will turn Off

Quick Code Enrollment

1. Car **MUST** be stopped **AND** engine **OFF**
2. Press the fob button once
Engine Start / Stop switch back light begins flashing, indicating a Valid ID has been detected
3. **Press and HOLD** the Engine Stop switch for 5-seconds
Engine Start / Stop switch back light will turn **ON** solid
4. After 5-seconds has elapsed
Engine Start / Stop switch back light will flicker-flash indicating receiver is in "Learn" mode
5. **RELEASE** the Engine Stop switch
6. Press the button on **NEW** fob that is being enrolled
7. If code enrollment is successful
Engine Start / Stop switch back light will double flash and receiver will exit "Learn" mode
8. Test the new fob to verify it has been enrolled correctly

NOTE: Only ONE fob can be enrolled using the Manual ALL Erase & Code enrollment method



Blank

DRAWING NO.	REV	SHT
007388322		_of_1
REV.	DESCRIPTION	DATE
	RELEASE TO PRODUCTION	

CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
000	16 WHI	A1,B1,B2	GROUND
001	16 BLK	A2,B3,B4	POWER

8. VENDOR MAY REPLACE PIGTAILS WITH WIRING APPROVED BY MORGAN OLSON. CONNECTORS, PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNESS TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED WITH HEAT SHRINK TUBING. HEAT SHRINK BUTT SPLICES ARE ACCEPTABLE FOR M-O FABRICATION IF NECESSARY.
4. TAPE []: 6" AT BREAKOUTS AND 2" AT LOOM ENDS.
3. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
2. SPLIT ROLLY LOOM UNLESS JACKETED CABLE IS USED.
1. JACKETED CABLE AS NOTED.

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MORGAN OLSON

GENERAL STANDARD UNLESS OTHERWISE NOTED:
 1. DIMENSIONS IN U.S. UNITS.
 2. BREAK ALL EXPOSED SHARP EDGES AND CORNERS.
 3. DIMENSIONS TO CENTER UNLESS OTHERWISE SPECIFIED.
 4. DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED.
 5. DIMENSIONS TO CENTER UNLESS OTHERWISE SPECIFIED.
 6. DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED.

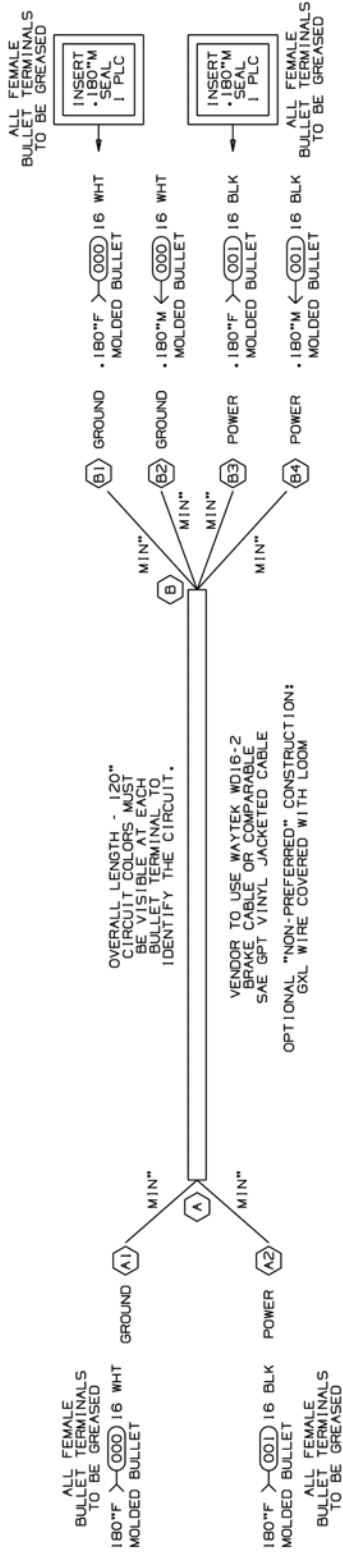
DATE: 09JUL07
 TMC: TMC
 07-0743

DATE: 09JUL07
 DO NOT SCALE

NAME: HARNESS JUMPER 120" 2W "Y"
 (180F TO 180F/180M EACH CRT)

DRAWING NO.: 007388322

SHT: NONE
 1 of 1



HARNESS AND LOOM TOLERANCES

UP TO 60" : -0/+2"
 60" TO 100" : -0/+4"
 100" TO 200" : -0/+5"
 200" TO 400" : -0/+6"
 400" TO 600" : -0/+7"
 OVER 600" : -0/+8"

BO TO BO : -0/+2"

TOLERANCE IS NOT ACCUMULATIVE. LENGTH APPLIES TO OVERALL HARNESS LENGTH, BREAKOUT TO END, OR LOOM.

FIRST USE: CURSIVE MID-BODY MARKER

DRAWING NO.		REV	SHT
007388323			1 OF 1
REV.	DESCRIPTION	BY	DATE
	RELEASE TO PRODUCTION		

CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
000	16 WHT	A1,B1,B2	GROUND
001	16 BLK	A2,B3,B4	POWER

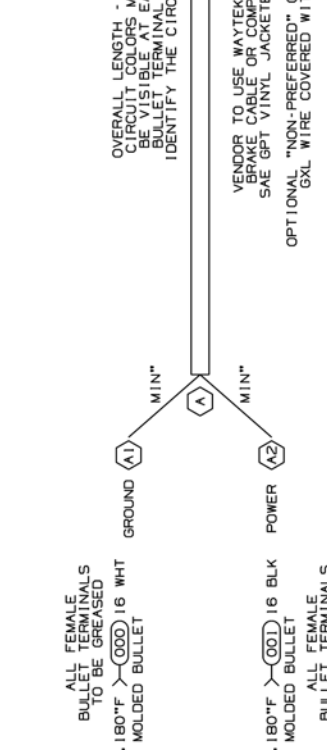
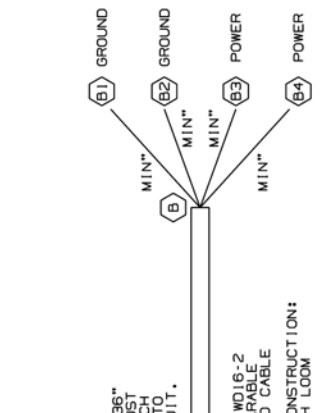
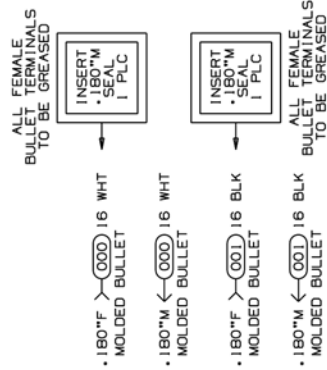
8. VENDOR MAY REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNESS TO BE TESTED FOR CONTENT OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED WITH HEAT SHRINK TUBING. HEAT SHRINK BUTT SPLICES ARE ACCEPTABLE FOR M.O. FABRICATION IF NECESSARY.
4. TAPE [|||||098]: 8" AT BREAKOUTS AND 2" AT LOOM ENDS.
3. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
2. SPLIT POLY LOOM UNLESS JACKETED CABLE IS USED.
1. JACKETED CABLE AS NOTED.

NOTES:

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MORGAN OLSON	
GENERAL STANDARD UNLESS OTHERWISE NOTED	
1. JAMES A. O.S. WORKS	XXX + 010
2. FOR PLATING ALL HARDCOPY MUST BE CHECKED	
3. FOR PLATING ALL HARDCOPY MUST BE CHECKED	
4. FOR PLATING ALL HARDCOPY MUST BE CHECKED	
DATE	07-1802
DATE	25OCT07
DATE	25OCT07
DATE	25OCT07
DO NOT SCALE	
NAME	
HARNESS JUMPER 36" 2W "Y" (180F TO 180M EACH CKT)	
DRAWING NO.	007388323
SHT	NONE
1 OF 1	



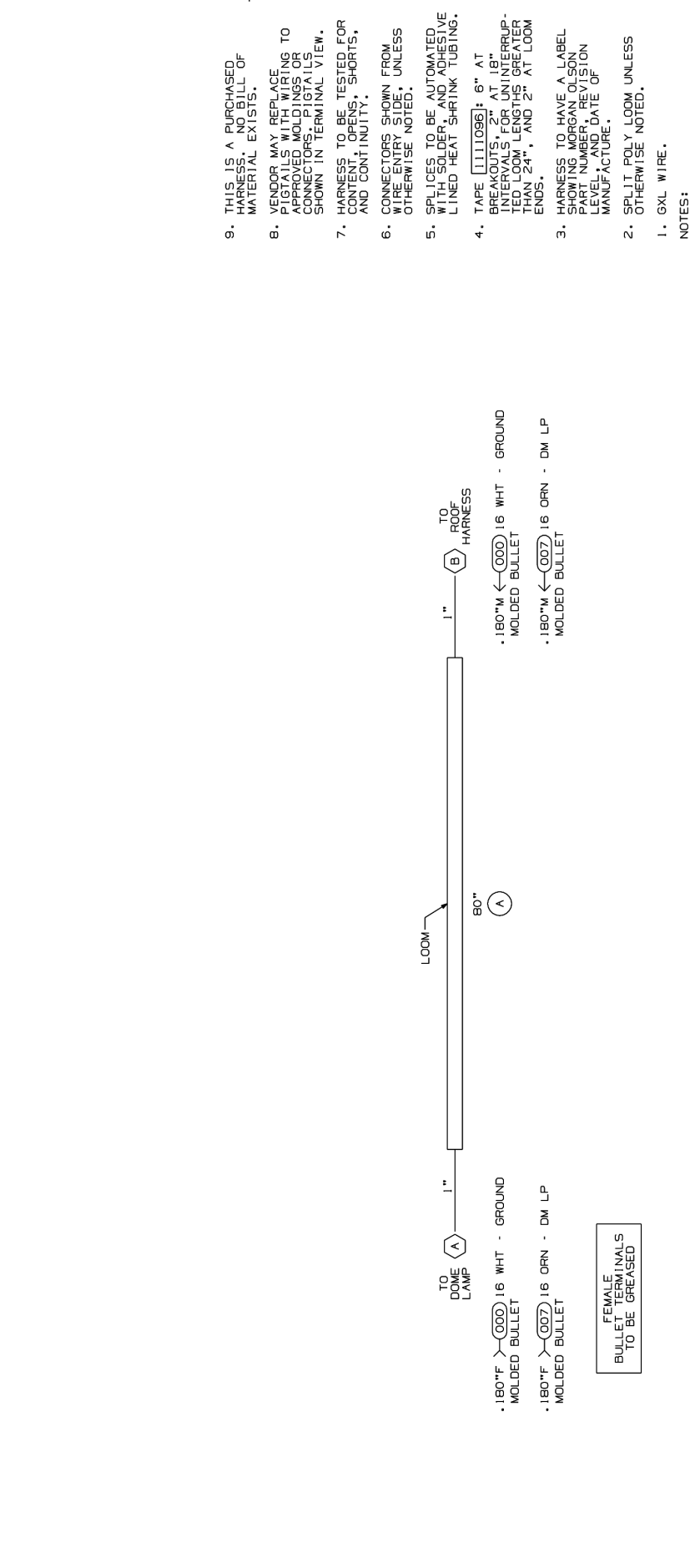
HARNESS AND LOOM TOLERANCES

UP TO 60" : -0/+2"
 60" TO 100" : -0/+4"
 100" TO 200" : -0/+5"
 200" TO 400" : -0/+6"
 400" TO 600" : -0/+7"
 OVER 600" : -0/+8"

BO TO BO : -0/+2"
 TOLERANCE IS NOT ACCUMULATIVE. LENGTH APPLIES TO OVERALL HARNESS LENGTH, BREAKOUT TO END, OR LOOM.

FIRST USE:
 SIDE MARKER
 INSTALLATION
 BASED ON:
 007388322

DRAWING NO.	REV	SHT	
090093202	A	1 Of 1	
REV.	DESCRIPTION	BY	ECO. NO.
	RELEASE FOR PRODUCTION	CHK.	DATE
A	80" WAS 64"	WPS	DATE



PROPRIETARY

MORGAN OLSON

GENERAL STANDARDS UNLESS OTHERWISE NOTED

- TOLERANCE: ±.000 INCHES
- BREAK ALL EXPOSED SHARP EDGES AND DEBURR 1/16"
- WIRE SHALL BE APPROVED BY THE CUSTOMER
- WIRE SHALL BE APPROVED BY THE CUSTOMER

DATE	260CT09	DATE	26B16
DO NOT SCALE		DO NOT SCALE	

HARN JPR CRG D/LP
GEN .180BLLT

HARNES AND LOOM TOLERANCES

UP TO 60" = -0/+2"
60" TO 100" = -0/+4"
100" TO 200" = -0/+5"
200" TO 400" = -0/+6"
400" TO 600" = -0/+7"
OVER 600" = -0/+8"

BO TO BO = -0/+2"

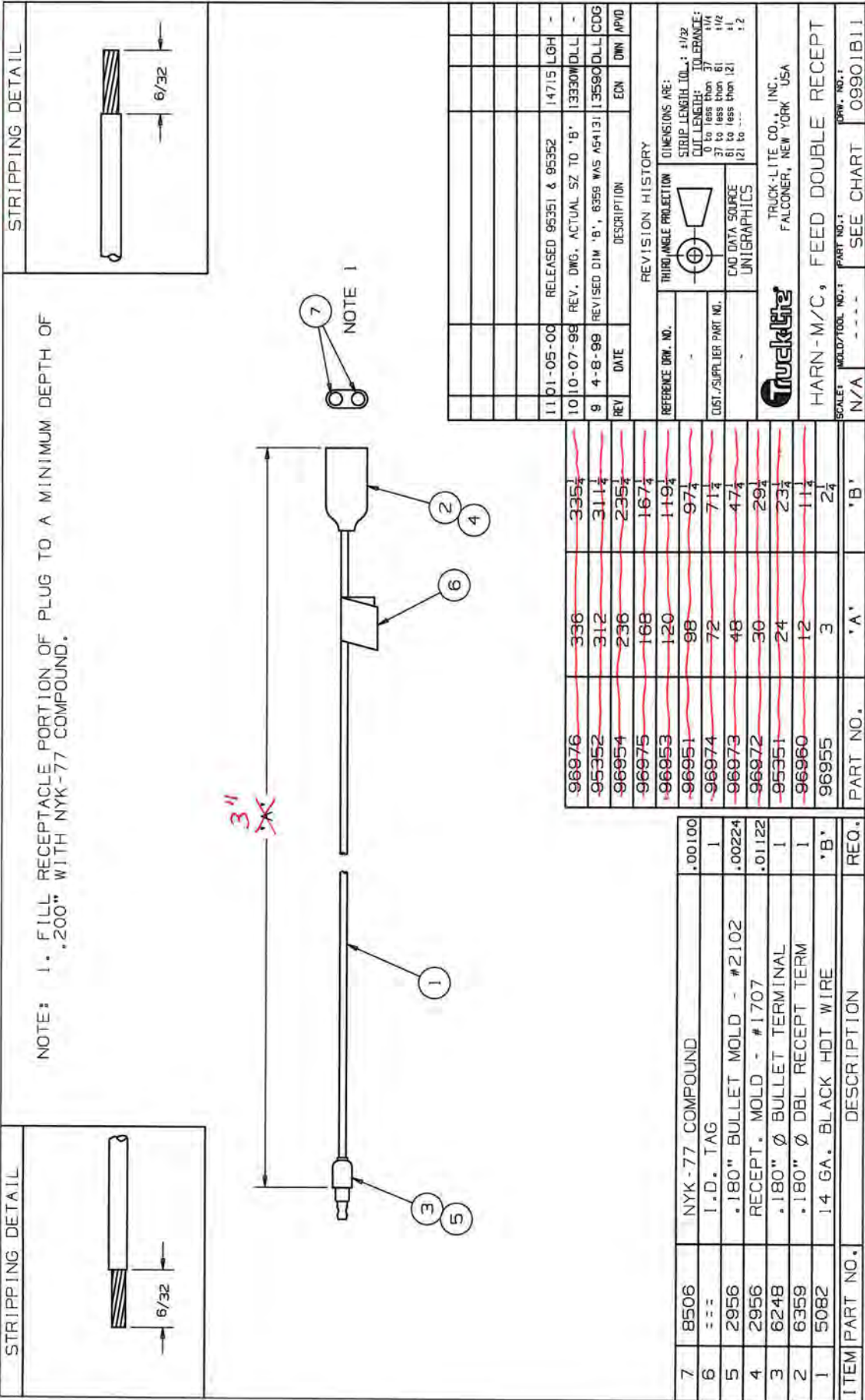
LENGTHS APPLY FROM BREAKOUT TO BREAKOUT OR BREAKOUT TO WIRE ENTRY SIDE OF CONNECTOR, OR END OF COVER.

FIRST USE:
CV100632
BASED ON:
007386526

NOTES:

9. THIS IS A PURCHASED HARNES. NO BILL OF MATERIAL EXISTS.
8. VENDOR MAY REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNES TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM THE VIEW THEY USE, UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED WITH SOLDER, AND ADHESIVE LINED HEAT SHRINK TUBING.
4. TAPE [1111096] 6" AT BREAKOUTS, 2" AT 18" INTERVALS, OR UNIFORM INTERVALS. LEAD LENGTHS SHALL BE 24", AND 2" AT LOOM ENDS.
3. HARNES TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
2. SPLIT POLY LOOM UNLESS 1. GXL WIRE.

46010675



REV	DATE	DESCRIPTION	ECN	OWN	APVD
1	01-05-00	RELEASED 95351 & 95352	14715	LGH	-
10	10-07-99	REV. DIM. ACTUAL SZ TO 'B'	13330WDL	-	-
9	4-8-99	REVISED DIM 'B', 6359 WAS A54131	13590DLL	CDG	-

REFERENCE DRW. NO.	THIRD ANGLE PROJECTION	DIMENSIONS ARE:
		STRIP LENGTH (L): ±1/32
		CUT LENGTH: TOLERANCE:
		0 to less than 37 1/4
		37 to less than 61 1/2
		61 to less than 121 1/2
		121 to ... 1/2

REV	DATE	DESCRIPTION	ECN	OWN	APVD
7	8506	NYK-77 COMPOUND			
6	2956	I.D. TAG			
5	2956	.180" BULLET MOLD - #2102			
4	2956	RECEPT. MOLD - #1707			
3	6248	.180" Ø BULLET TERMINAL			
2	6359	.180" Ø DBL RECEPT TERM			
1	5082	14 GA. BLACK HDT WIRE			

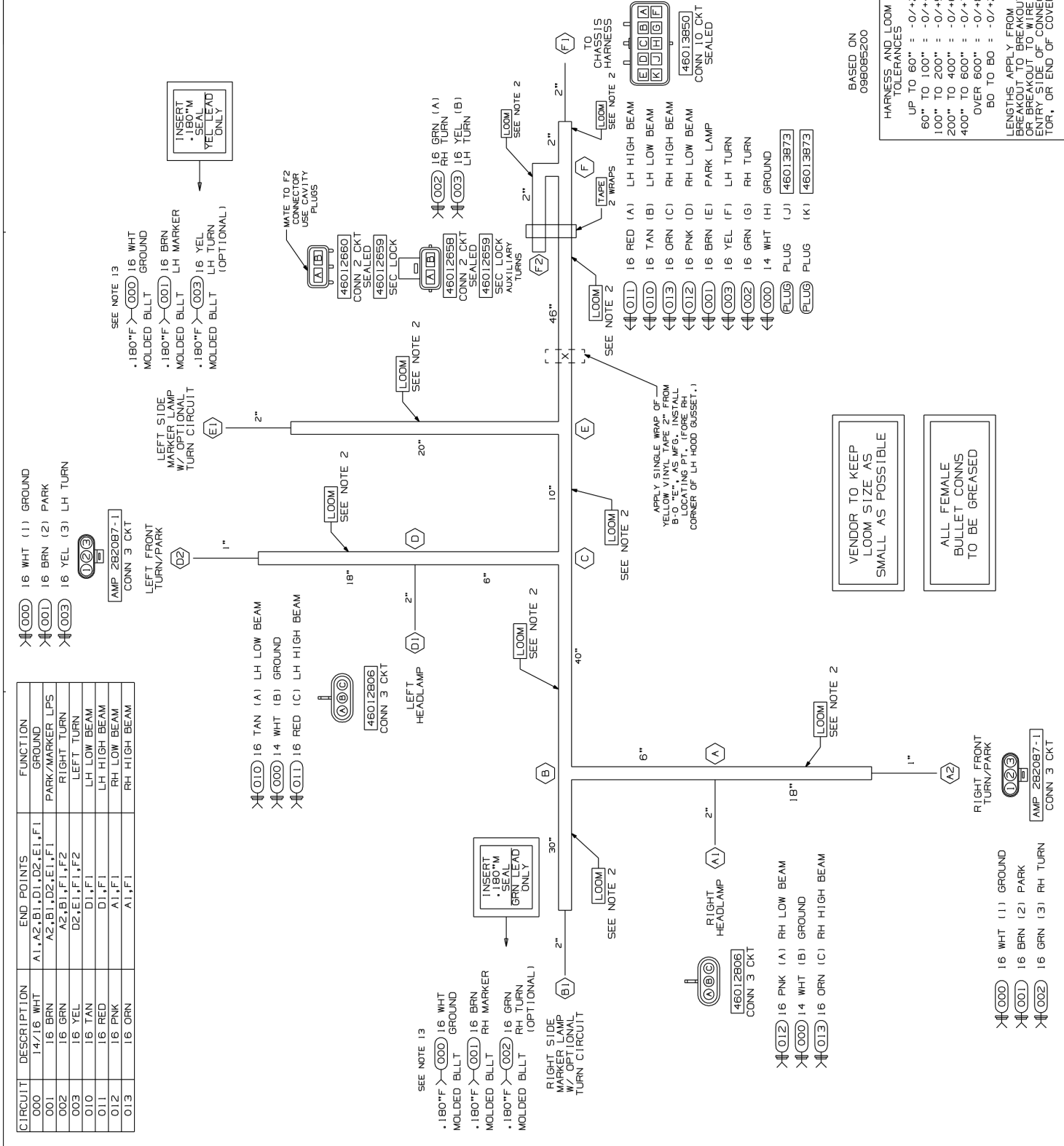
ITEM	PART NO.	DESCRIPTION	REQ.

SCALE	MOLD TOOL NO.†	PART NO.†	DRW. NO.†
N/A	----	----	09901B11

REL 06-0761

46010675

DRAWING NO.	REV	SHT
098085201	A	1 OF 1
DESCRIPTION		
RELEASE TO PRODUCTION		
BY DATE		
APPROVED BY DATE		
REDRAWN & REVISED		
DATE		
BY		
DATE		



9. THIS IS A PURCHASED HARNESS. NO BILL OF MATERIAL EXISTS.
10. VENDOR MAY REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
11. HARNESS TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
12. CONNECTORS SHOWN FROM OTHER SIDE, UNLESS OTHERWISE NOTED.
13. SPLICES TO BE AUTOMATED WITH SOLDER AND ADHESIVE LINED HEAT SHRINK TUBING
14. TAPE [1111098]: 6" AT BREAKOUTS, 2" AT 18" INTERVALS, 4" AT GREATER THAN 24", AND 2" AT LOOM ENDS.
15. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON LEVEL AND DATE OF MANUFACTURE.
16. SPLIT NYLON LOOM, BLACK WITH GRAY STRIPE ONLY, UNLESS OTHERWISE NOTED.
17. GXL WIRE.

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MORGAN OLSON

GENERAL STANDARDS UNLESS OTHERWISE NOTED:
 1. TOLERANCE: ±.000 .XX ±.000 .XXX ±.010
 2. BREAK ALL EXPOSED SHARP EDGES AND DEBURR.
 3. FIT ALL PARTS TOGETHER ALL INSIDE CORNERS MUST BE ROUNDED.
 4. DIMENSIONS TO THE CENTER UNLESS OTHERWISE NOTED.
 5. DIMENSIONS TO THE SURFACE UNLESS OTHERWISE NOTED.
 6. DIMENSIONS TO THE CENTER UNLESS OTHERWISE NOTED.

DRAWN: TJM
 CHECKED: TJM
 DATE: 01.APR09
 DATE: 01.APR09
 TIME: 26770
 TIME: 26770

NAME: DO NOT SCALE
 M-100 FCC
 SCALE: NONE
 SHEET: 098085201
 DRAWING NO.: 2009 FCC W/ RECT HD LMP
 PART NO.: HARNESSES - HOOD AND LED LAMP
 REV: A

BASED ON 098085200

HARNESSES AND LOOM TOLERANCES

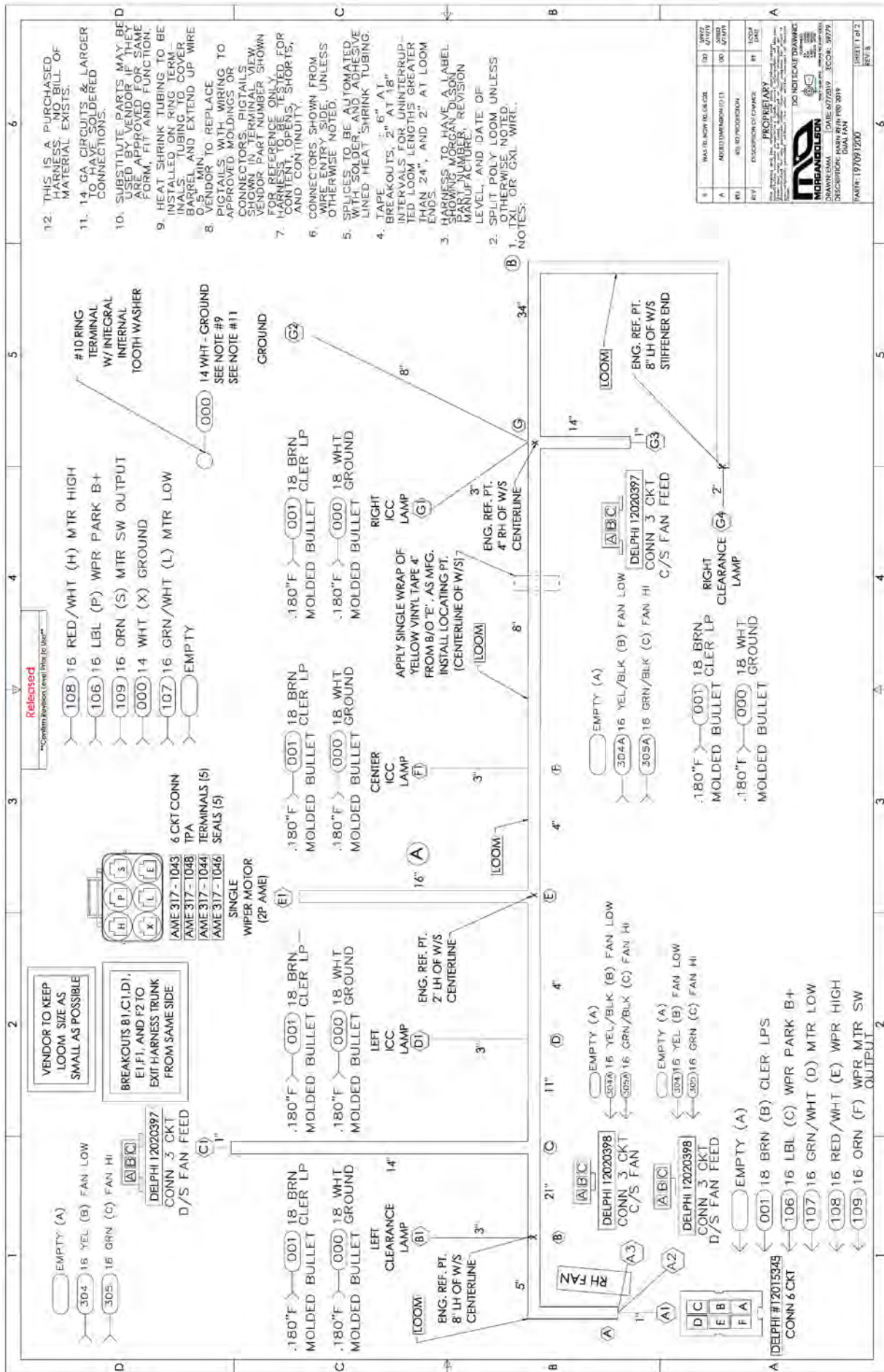
UP TO 60"	-0/+2"
60" TO 100"	-0/+4"
100" TO 200"	-0/+5"
200" TO 400"	-0/+6"
400" TO 600"	-0/+7"
OVER 600"	-0/+8"

BO TO BO = -0/+2"

LENGTHS APPLY FROM BREAKOUT TO BREAKOUT, OR BREAKOUT TO WIRE ENTRY SIDE OF CONNECTOR, OR END OF COVER.

VENDOR TO KEEP LOOM SIZE AS SMALL AS POSSIBLE

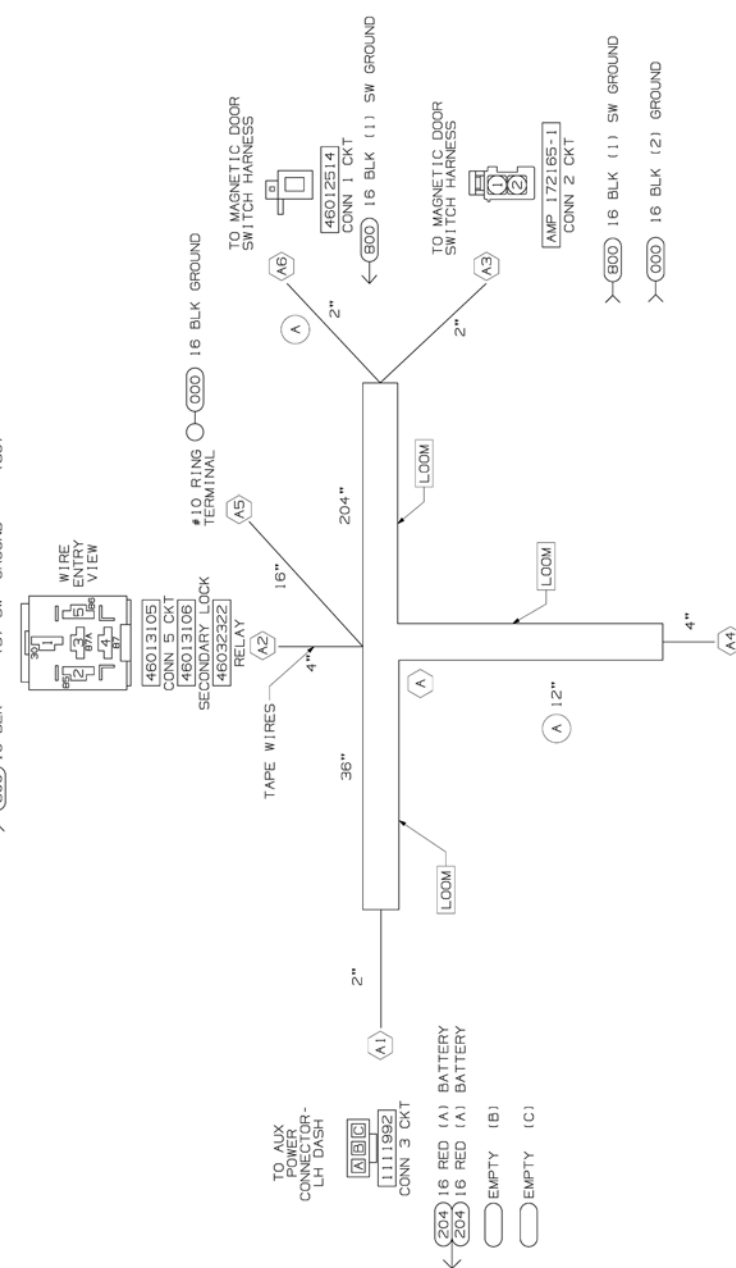
ALL FEMALE BULLET CONNS TO BE GREASED



DRAWING NO.	REV	SHT
137392203	A	1 OF 1
DESCRIPTION	REV	DATE
RELEASE TO PRODUCTION	ALL	4/20/07
12" WAS 225" BREAKOUT AB ADDED	ALL	1/27/13

CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
800	16 BLK SW GROUND	A2, A3	SW GROUND
204	16 RED BATTERY	A1, A2	BATTERY
006	16 TAN STEPWELL LP	A2, A4	STEPWELL LP
000	16 BLK GROUND	A3, A4, A5	GROUND

- > (204) 16 RED (1) BATTERY (30)
- > (204) 16 RED (2) BATTERY (85)
- EMPTY (87A)
- > (006) 16 TAN (4) STEPWELL LP (87)
- > (800) 16 BLK (5) SW GROUND (86)



BASED ON:
127592201

HARNESS AND LOOM TOLERANCES
 UP TO 60" = -0/+2"
 60" TO 100" = -0/+4"
 100" TO 200" = -0/+5"
 200" TO 400" = -0/+6"
 400" TO 600" = -0/+7"
 OVER 600" = -0/+8"
 BO TO BO = -0/+2"
 TOLERANCE IS NOT ACCUMULATIVE. LENGTH APPLIES TO OVERALL HARNESS LENGTH, BREAKOUT TO END, OR LOOM.

8. VENDOR MAY REPLACE PIGTAILS WITH WIRING APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNESS TO BE TESTED FOR CONTENT OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED WITH HEAT SHRINK TUBING. HEAT SHRINK BUTT SPLICES ARE ACCEPTABLE FOR M-O FABRICATION IF NECESSARY.
4. TAPE [1111096]: 6" AT BREAKOUTS AND 2" AT LOOM ENDS.
3. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION NUMBER, AND DATE OF MANUFACTURE.
2. SPLIT POLY LOOM UNLESS OTHERWISE NOTED.
1. GXL WIRE.

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MORGAN OLSON	
GENERAL STANDARDS UNLESS OTHERWISE NOTED:	
1. HARNESS TO BE MADE TO ORDER. M-O WIRE SHALL BE USED UNLESS OTHERWISE NOTED.	DATE: 17OCT13
2. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 42059
3. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
4. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
5. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
6. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
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81. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
82. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
83. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
84. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
85. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
86. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
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89. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
90. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
91. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
92. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
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96. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
97. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
98. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
99. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13
100. FOR ALL PARTS, ALL DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE NOTED.	DATE: 17OCT13

DRAWING NO.	REV	SHT
155084203	A	1 OF 1
DESCRIPTION		
REV.	DATE	BY
RELEASE FOR PRODUCTION		
A		ALL

9. THIS IS A PURCHASED HARNES. NO LABEL OF MATERIAL EXISTS.
10. VENDOR MAY REPLACE PIGTAILS WITH WIRING OR APPROVED MOLDINGS OR CONNECTIONS. THIS IS SHOWN IN TERMINAL VIEW.
11. HARNES TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
12. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
13. SPLICES TO BE AUTOMATED WITH SOLDER AND ADHESIVE LINED HEAT SHRINK TUBING.
14. TAPE (1111098); 6" AT BREAKOUTS; 2" AT 18" INTERVALS FOR UNINTERRUPTED LOOM LENGTHS GREATER THAN 24", AND 2" AT LOOM ENDS.
15. HARNES TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
16. SPLIT PLY LOOM UNLESS OTHERWISE NOTED.
17. OXL WIRE.

PROPRIETARY

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MORGAN OLSON

GENERAL STANDARDS UNLESS OTHERWISE NOTED:
 1. TOLERANCE - ± .000 UNLESS OTHERWISE SPECIFIED.
 2. DIMENSIONS ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
 3. ALL DIMENSIONS ARE TO THE CENTER UNLESS OTHERWISE SPECIFIED.
 4. DIMENSIONS TO THE CENTER UNLESS OTHERWISE SPECIFIED.

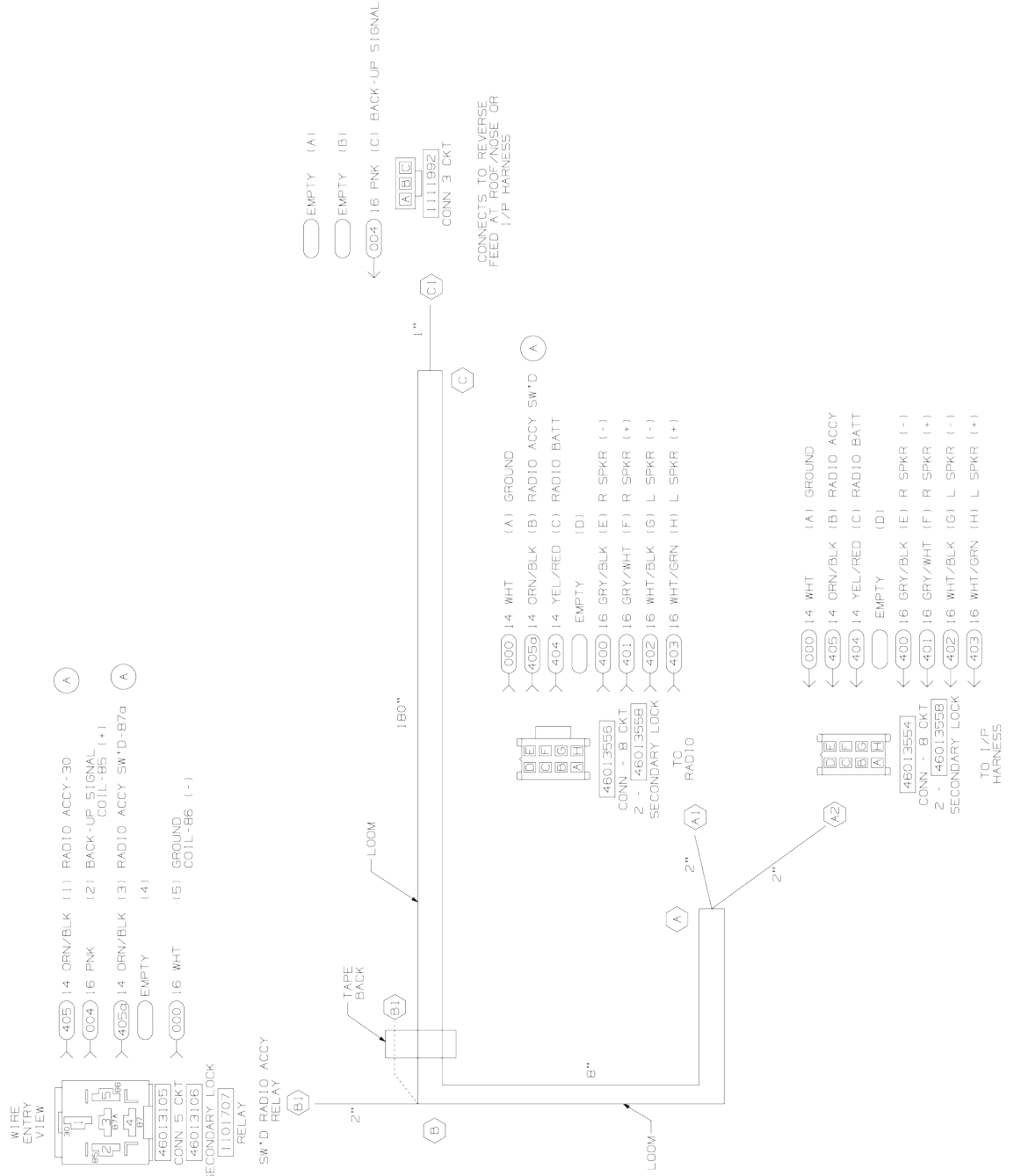
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 DATE: 09SEP15

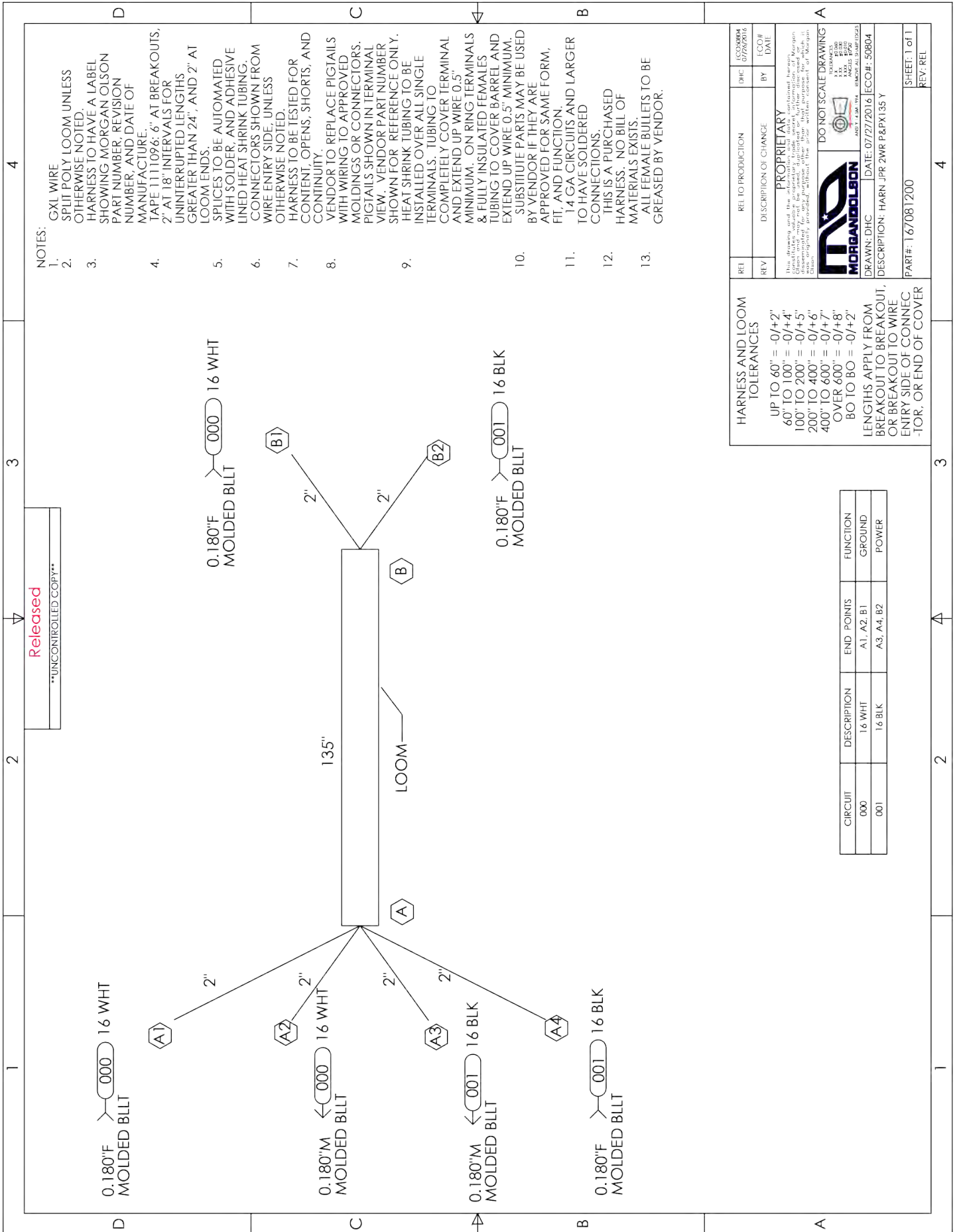
DO NOT SCALE

HARN SW RADIO OFF
 REV TR16 W/ RLY

SHT: 1 OF 1
 SCALE: NONE
 REV: A

CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
000	14/16 WHT	A2, B1	GROUND
405a	14 ORN/BLK	A1, B1	RADIO ACCY SW'D
004	16 PNK	B1, C1	BACK-UP SIGNAL
400	16 GRN/BLK	A1, A2	R SPKR (-)
401	16 GRN/WHI	A1, A2	R SPKR (+)
402	16 WHI/BLK	A1, A2	L SPKR (-)
403	16 WHI/GRN	A1, A2	L SPKR (+)
404	14 YEL/RED	A1, A2	RADIO BATT
405	14 ORN/BLK	A1, A2	RADIO ACCY





NOTES:

1. GXL WIRE
2. SPLIT POLY LOOM UNLESS OTHERWISE NOTED.
3. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION NUMBER, AND DATE OF MANUFACTURE.
4. TAPE 1111096; 6" AT BREAKOUTS, 2" AT 18" INTERVALS FOR UNINTERRUPTED LENGTHS GREATER THAN 24", AND 2" AT LOOM ENDS.
5. SPLICES TO BE AUTOMATED WITH SOLDER AND ADHESIVE LINED HEAT SHRINK TUBING.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
7. HARNESS TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
8. VENDOR TO REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW. VENDOR PART NUMBER SHOWN FOR REFERENCE ONLY. HEAT SHRINK TUBING TO BE INSTALLED OVER ALL SINGLE TERMINALS. TUBING TO COMPLETELY COVER TERMINAL AND EXTEND UP WIRE 0.5" MINIMUM. ON RING TERMINALS & FULLY INSULATED FEMALES TUBING TO COVER BARREL AND EXTEND UP WIRE 0.5" MINIMUM.
9. SUBSTITUTE PARTS MAY BE USED BY VENDOR IF THEY ARE APPROVED FOR SAME FORM, FIT, AND FUNCTION.
10. 14 GA CIRCUITS AND LARGER TO HAVE SOLDERED CONNECTIONS.
11. THIS IS A PURCHASED HARNESS. NO BILL OF MATERIALS EXISTS.
12. ALL FEMALE BULLETS TO BE GREASED BY VENDOR.

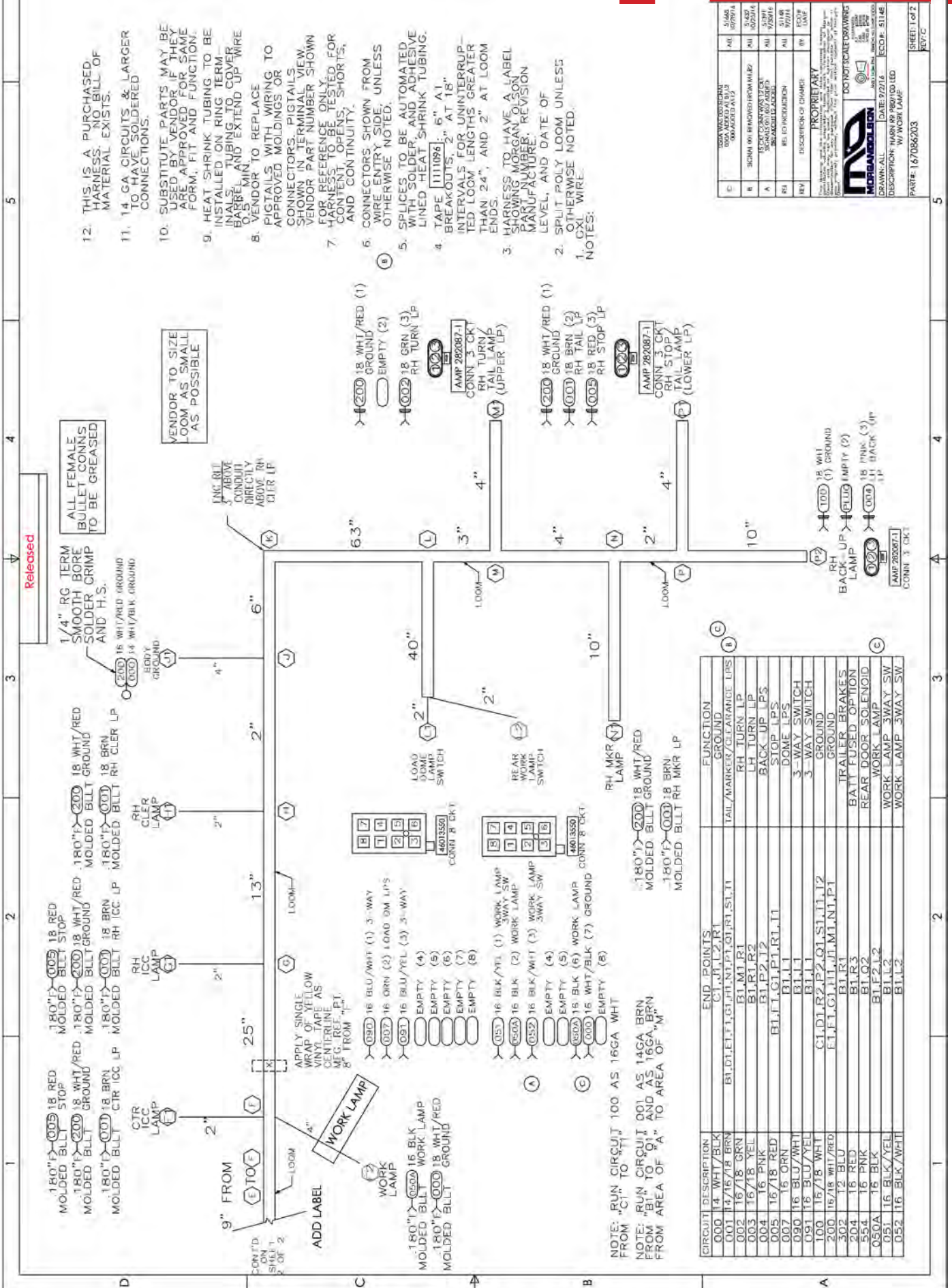
HARNESS AND LOOM TOLERANCES

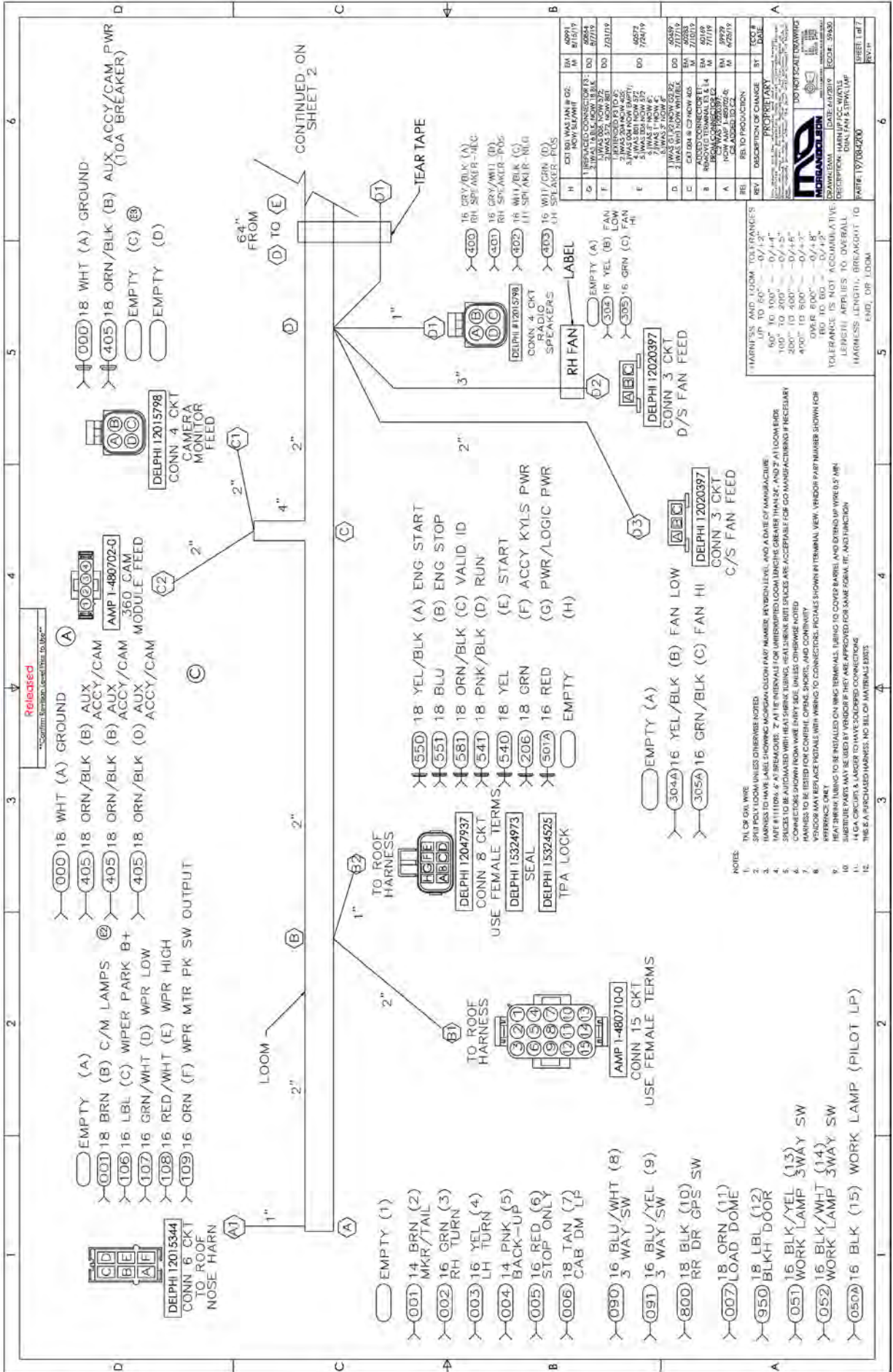
UP TO 60" = -0/+2"
 60" TO 100" = -0/+4"
 100" TO 200" = -0/+5"
 200" TO 400" = -0/+6"
 400" TO 600" = -0/+7"
 OVER 600" = -0/+8"
 BO TO BO = -0/+2"

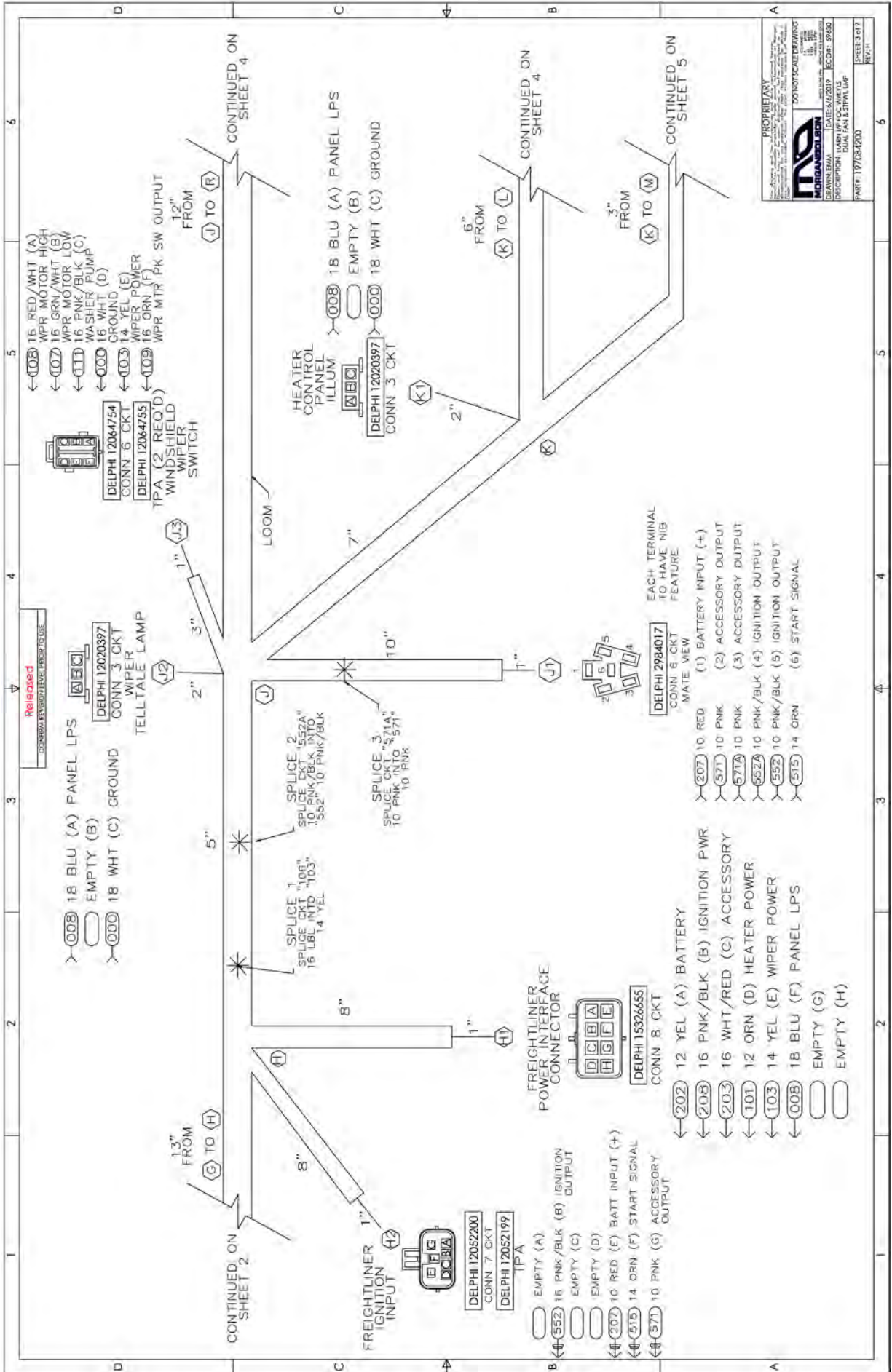
LENGTHS APPLY FROM BREAKOUT TO BREAKOUT, OR BREAKOUT TO WIRE ENTRY SIDE OF CONNECTOR, OR END OF COVER

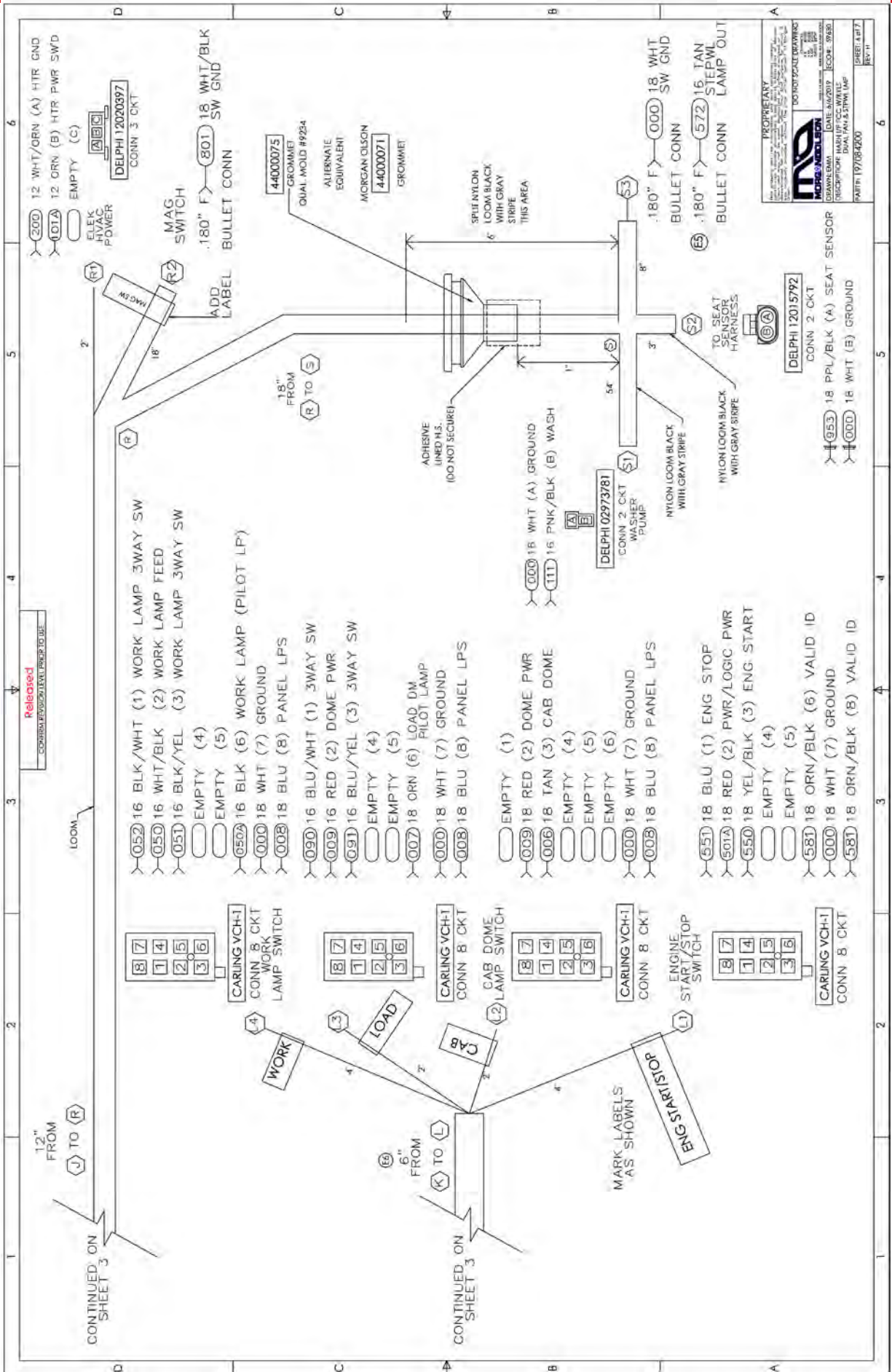
CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
000	16 WHT	A1, A2, B1	GROUND
001	16 BLK	A3, A4, B2	POWER

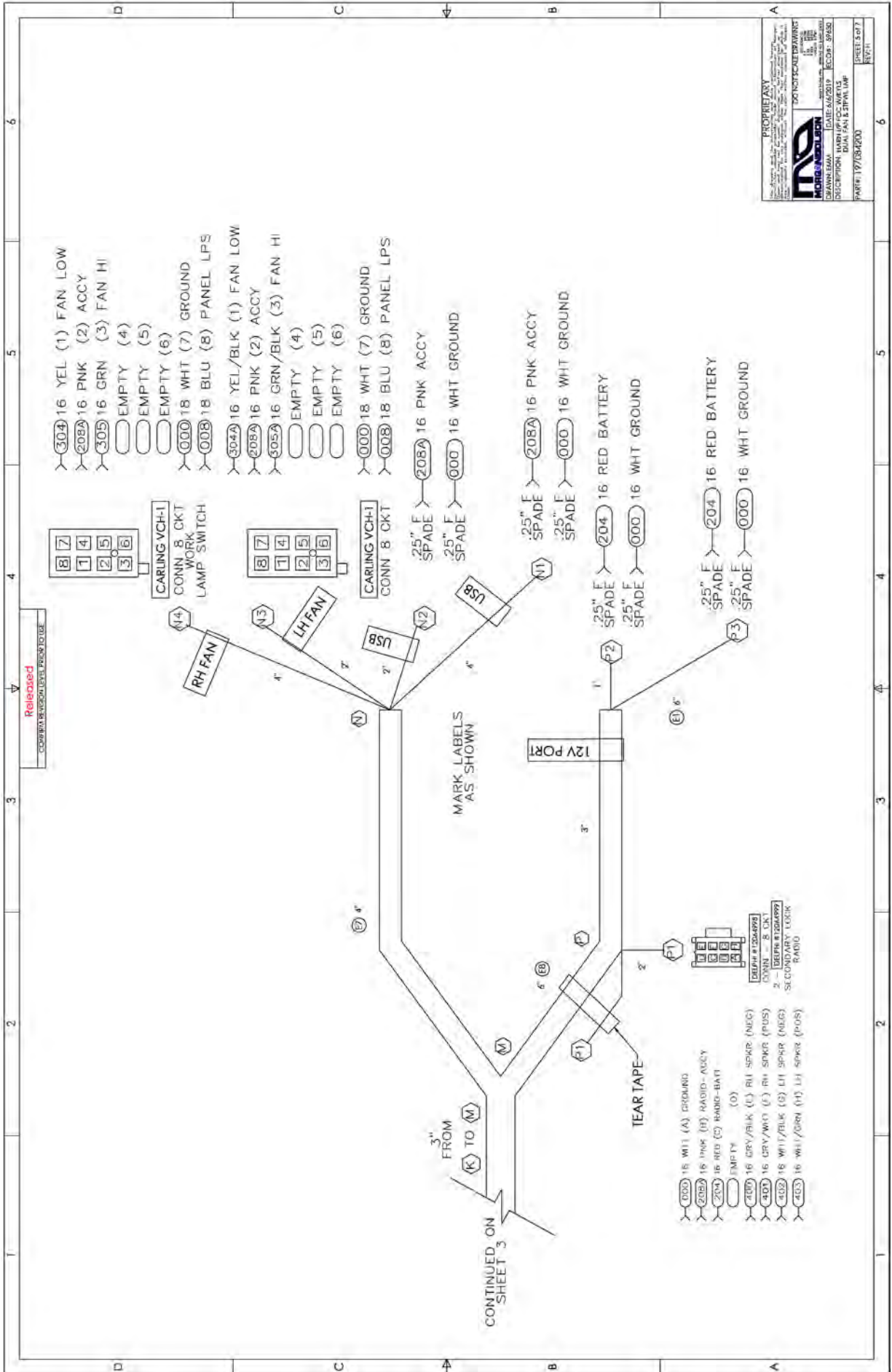
REL	REL TO PRODUCTION	DHC	ECO#0804 07/26/2016
REV	DESCRIPTION OF CHANGE	BY	ECO# DATE
<p>PROPRIETARY</p> <p>This drawing and the information contained hereon are the property of Morgan Olson and are not to be disclosed, copied, or used in any way without the prior written consent of Morgan Olson.</p> <p>MORGAN OLSON 1000 W. 13th St. Ames, IA 50010 515.281.2200</p> <p>DO NOT SCALE DRAWING</p>			
DRAWN: DHC		DATE: 07/27/2016	ECO#: 30804
DESCRIPTION: HARN_2WR_P&X135 Y			
PART#: 167081200		SHEET 1 of 1	
		REV: REL	

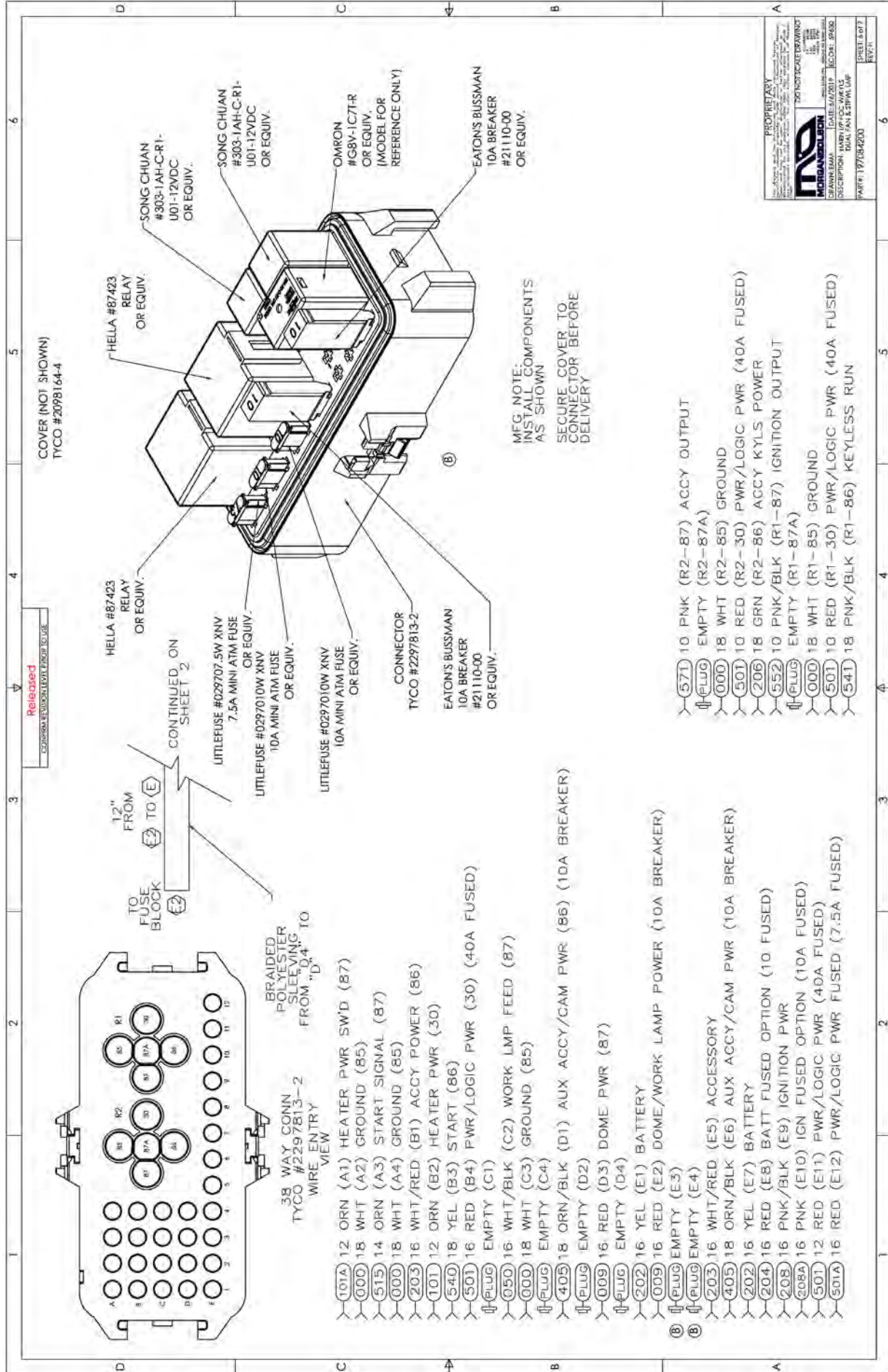


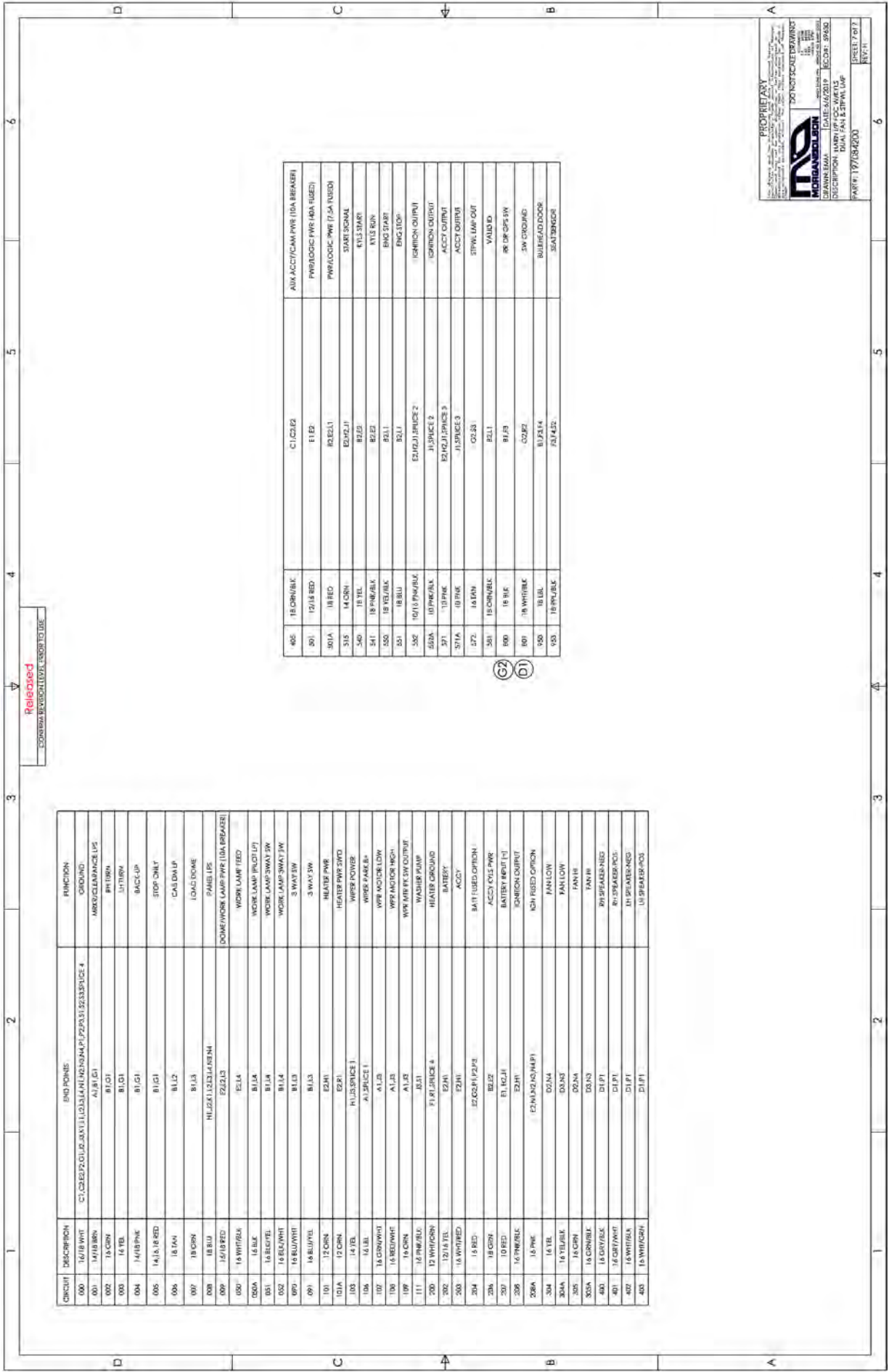










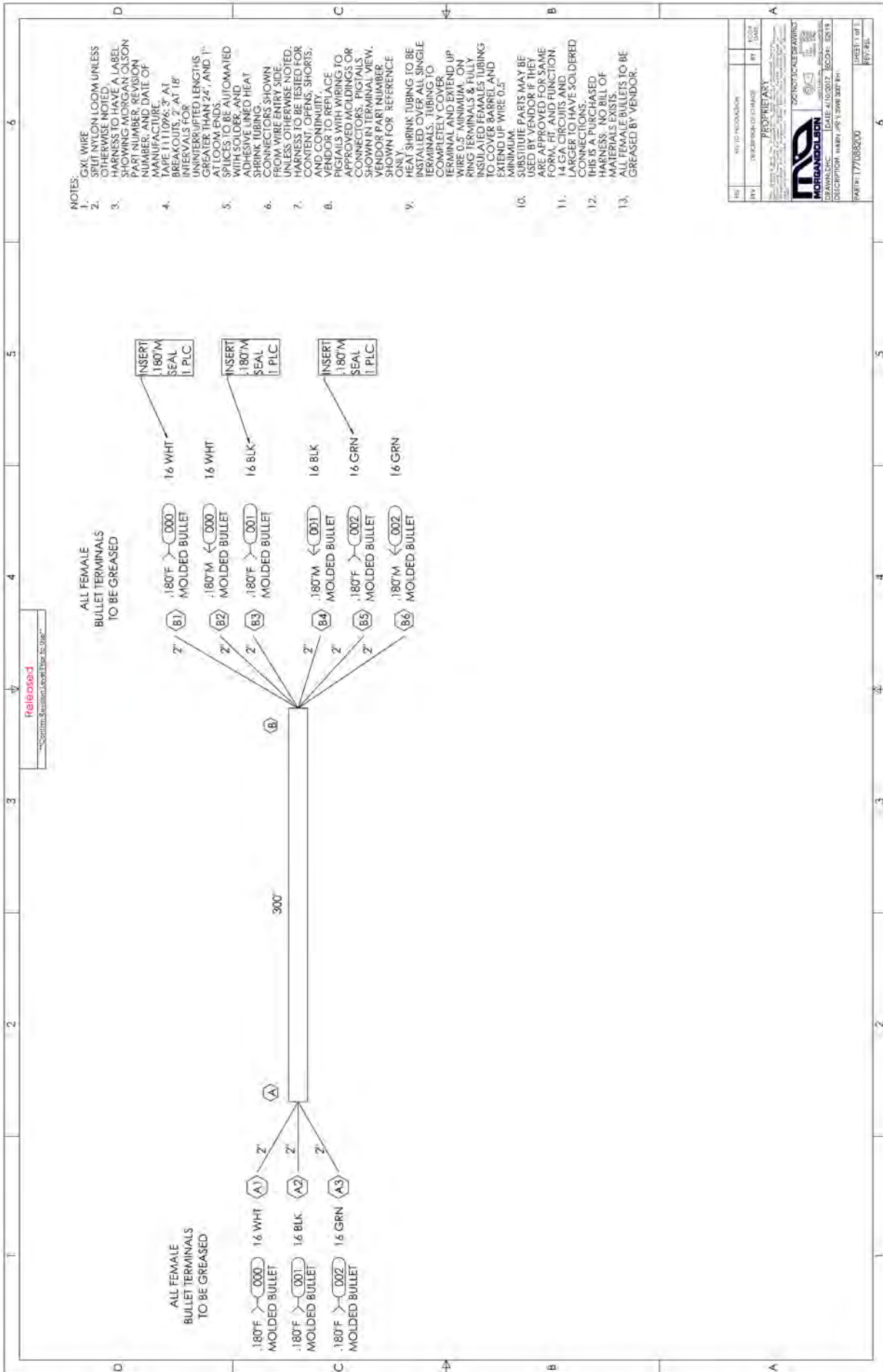


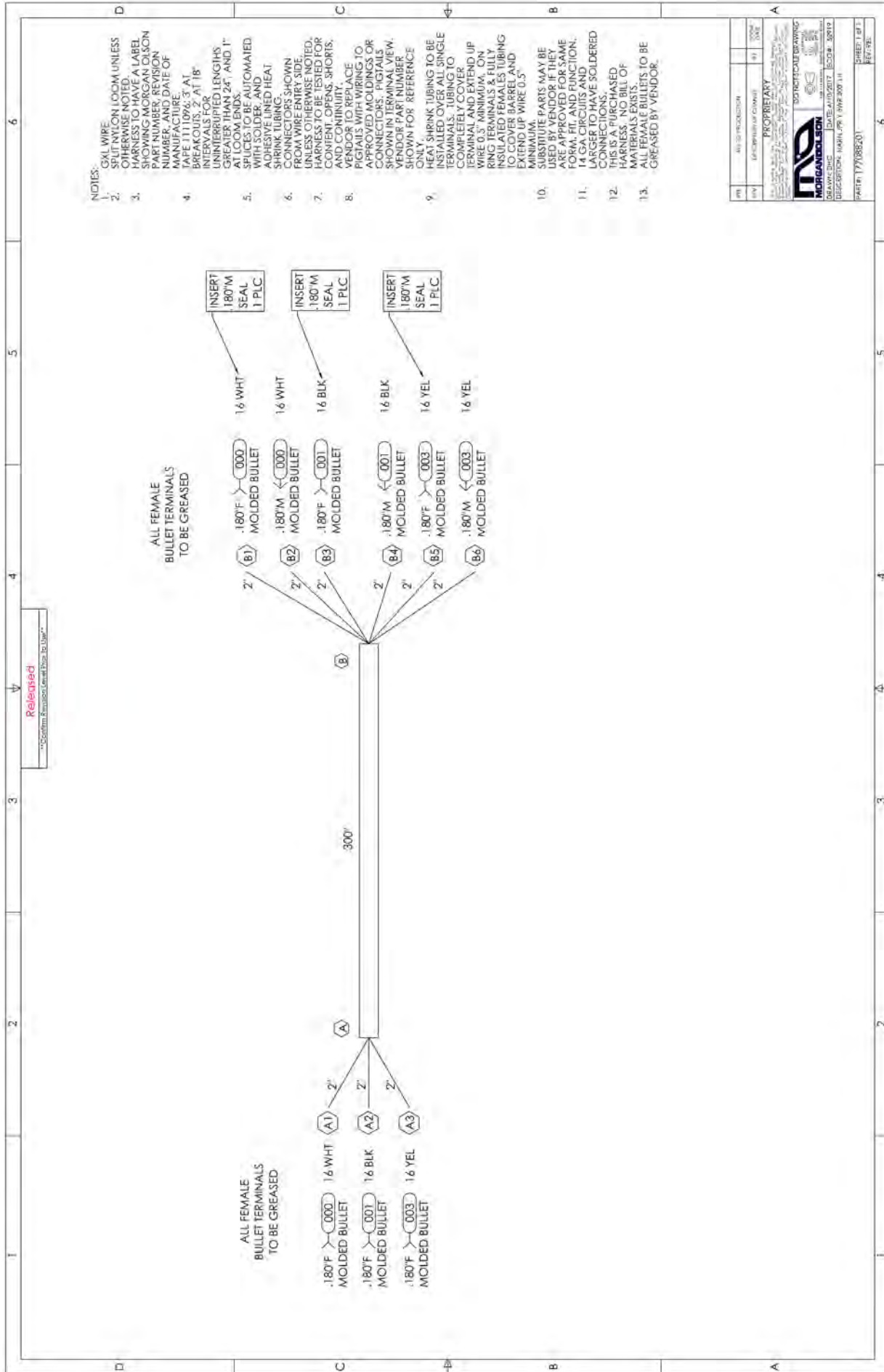
PROPRIETARY
DO NOT REPRODUCE OR DISSEMINATE WITHOUT WRITTEN PERMISSION OF MORGAN OLSON

MORGAN OLSON
10000 W. 16TH AVENUE, DENVER, CO 80202
TEL: 303.440.1000 FAX: 303.440.1001
WWW.MORGANOLSON.COM

DATE: 04/20/19
DRAWN BY: JCC, MAF, US
CHECKED BY: RWS
DESCRIPTION: HARBOR POC W/13
DUAL FAN & 3PWA LUP

PART: 197/384200
SHEET 7 of 7
REV: 1





REV	REV TO PREVIOUS	DATE	BY
01	DESCRIPTION OF CHANGE		

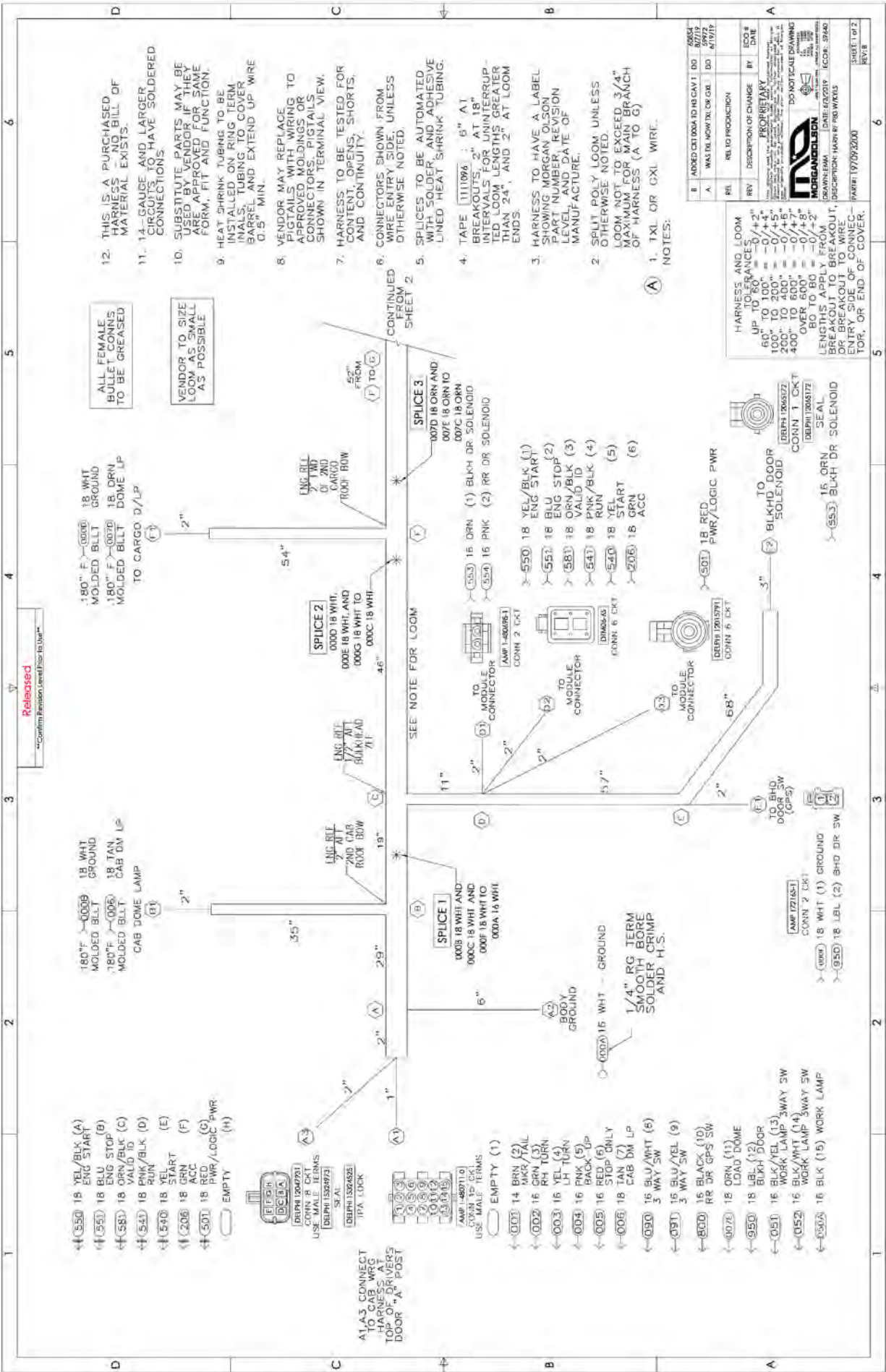
PROPRIETARY

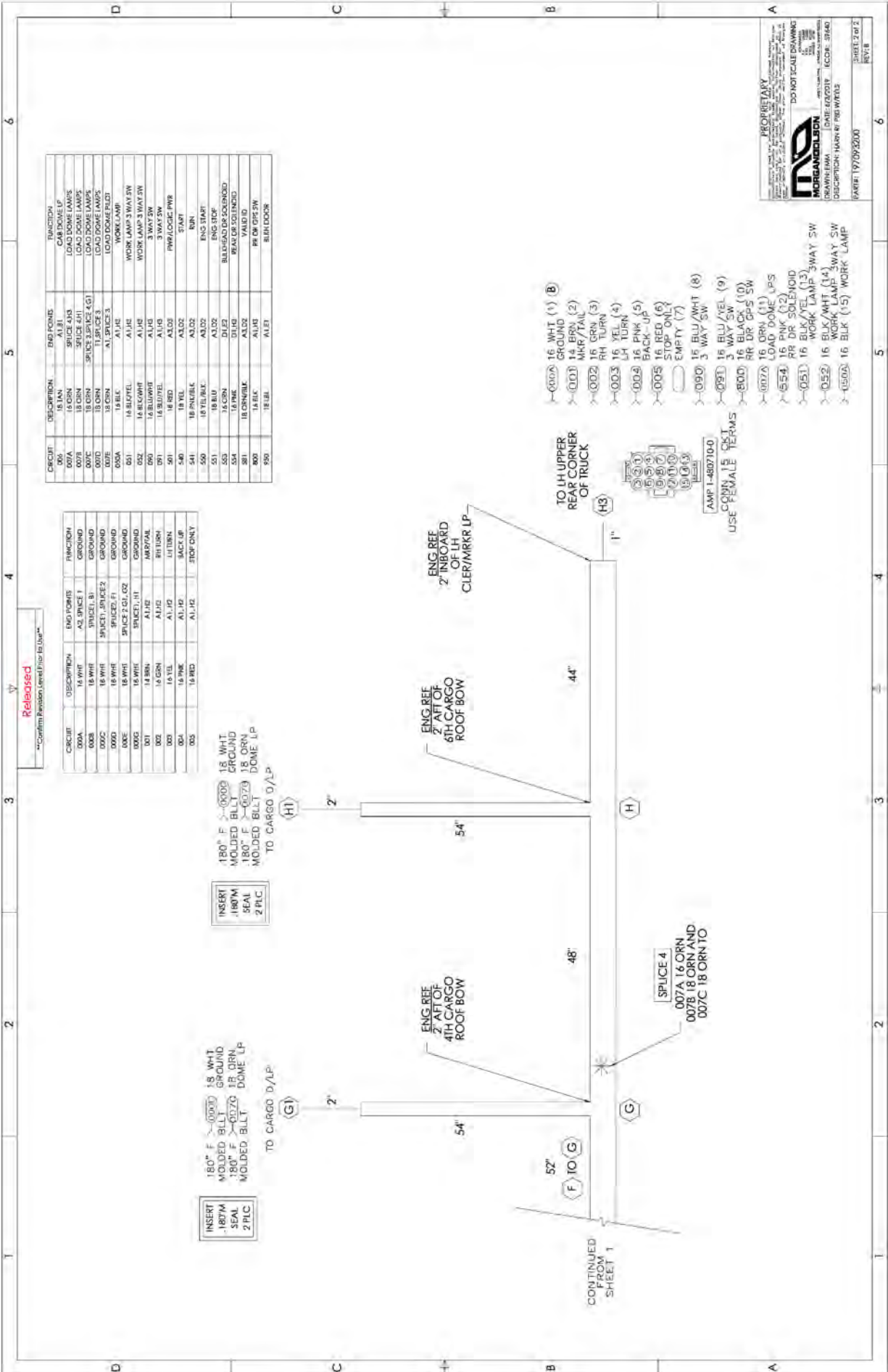
MORGAN OLSON

DATE: 01/08/12
DRAWN: DMC
DESCRIPTION: MASH, PPL, MW, 2007, 14

PART: 179088201

SHEET 1 OF 1





Confirm Revision Level Prior to Use

Released

CIRCUIT NO.	DESCRIPTION	WIRE COLOR	FUNCTION
000A	16 WHT	16 WHT	CLAR DOME LP
000B	16 GRN	16 GRN	LOAD DOME LAMP
000C	16 WHT	16 WHT	LOAD DOME LAMP
000D	16 GRN	16 GRN	LOAD DOME LAMP
000E	16 WHT	16 WHT	LOAD DOME LAMP
000F	16 GRN	16 GRN	LOAD DOME LAMP
000G	16 WHT	16 WHT	LOAD DOME LAMP
000H	16 GRN	16 GRN	LOAD DOME LAMP
000I	16 WHT	16 WHT	LOAD DOME LAMP
000J	16 GRN	16 GRN	LOAD DOME LAMP
000K	16 WHT	16 WHT	LOAD DOME LAMP
000L	16 GRN	16 GRN	LOAD DOME LAMP
000M	16 WHT	16 WHT	LOAD DOME LAMP
000N	16 GRN	16 GRN	LOAD DOME LAMP
000O	16 WHT	16 WHT	LOAD DOME LAMP
000P	16 GRN	16 GRN	LOAD DOME LAMP
000Q	16 WHT	16 WHT	LOAD DOME LAMP
000R	16 GRN	16 GRN	LOAD DOME LAMP
000S	16 WHT	16 WHT	LOAD DOME LAMP
000T	16 GRN	16 GRN	LOAD DOME LAMP
000U	16 WHT	16 WHT	LOAD DOME LAMP
000V	16 GRN	16 GRN	LOAD DOME LAMP
000W	16 WHT	16 WHT	LOAD DOME LAMP
000X	16 GRN	16 GRN	LOAD DOME LAMP
000Y	16 WHT	16 WHT	LOAD DOME LAMP
000Z	16 GRN	16 GRN	LOAD DOME LAMP
001	16 WHT	16 WHT	WORK LAMP
002	16 GRN	16 GRN	WORK LAMP
003	16 WHT	16 WHT	WORK LAMP
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148	16 GRN	16 GRN	WORK LAMP
149	16 WHT	16 WHT	WORK LAMP
150	16 GRN	16 GRN	WORK LAMP

PROPRIETARY

MORGAN OLSON

DO NOT SCALE DRAWING

DATE: 11/11/10

DESCRIPTION: HARNET REAR WHEEL

PART: 19/09/200

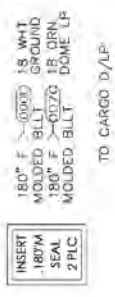
SHEET 2 OF 2

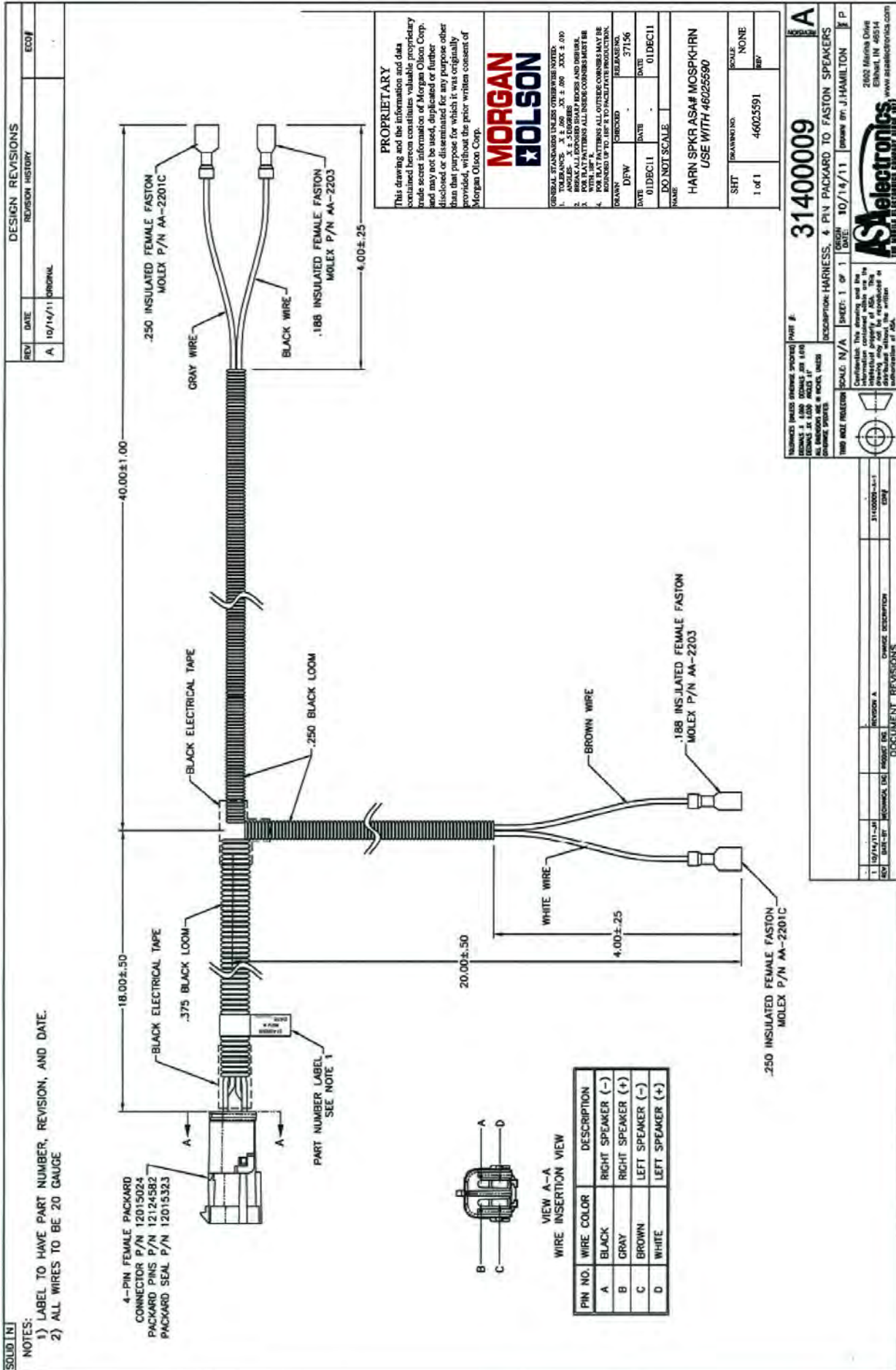
REV: B

- > 000A 16 WHT (1) (B)
- > 000B GROUND
- > 000C WHT/YEL (2)
- > 000D 16 GRN (3)
- > 000E RH TURN (4)
- > 000F LH TURN (5)
- > 000G BACK-UP (6)
- > 000H 16 RED (6)
- > 000I STOP ONLY (7)
- > 000J EMPTY (7)
- > 000K 16 BLU/WHT (8)
- > 000L 3 WAY SW
- > 000M 16 BLU/YEL (9)
- > 000N 3 WAY SW
- > 000O 16 BLACK (10)
- > 000P RR DR CPS SW
- > 000Q 16 ORN (11)
- > 000R LOAD DOME LPS
- > 000S 16 PNK (12)
- > 000T RR BL SOLENOID
- > 000U 16 BLK/WHT (13)
- > 000V 16 WORK LAMP 3WAY SW
- > 000W 16 BLK/WHT (14)
- > 000X 3WAY SW
- > 000Y 16 WORK LAMP 3WAY SW
- > 000Z 16 BLK (15)
- > 000A 16 BLK (15) WORK LAMP



AMP 1-4807100
CORNER LIGHTS
USE PERMANENT TERMINALS





DESIGN REVISIONS

REV	DATE	REVISION HISTORY	ECO#
A	10/14/11	PRODM	

NOTES:
 1) LABEL TO HAVE PART NUMBER, REVISION, AND DATE.
 2) ALL WIRES TO BE 20 GAUGE

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GENERAL STANDARDS UNLESS OTHERWISE NOTED:
 1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
 2. BREAK ALL EXPOSED SHARP EDGES AND CHAMFER.
 3. ALL FITTINGS ALL THREADS CONFORM TO THE WITHIN THE U.S.A.
 4. FOR PART PARTS ALL OUTSIDE DIMENSIONS HAVE TOLERANCES AS SHOWN UNLESS OTHERWISE SPECIFIED.

DRAWN	DFW	CHECKED	RELASNO.
DATE	01DEC11	DATE	01DEC11
DO NOT SCALE			
NAME			
HARN SPKR AS4# MOSPKHRN			
USE WITH 46025590			
SHT	DRAWING NO.	SCALE	NONE
1 of 1	46025591		REV

31400009

DESCRIPTION: HARNESS, 4 PIN PACKARD TO FASTON SPEAKERS

DATE: 10/14/11

DESIGNER: J. HAMILTON

SCALE: N/A

SHEET: 1 OF 1

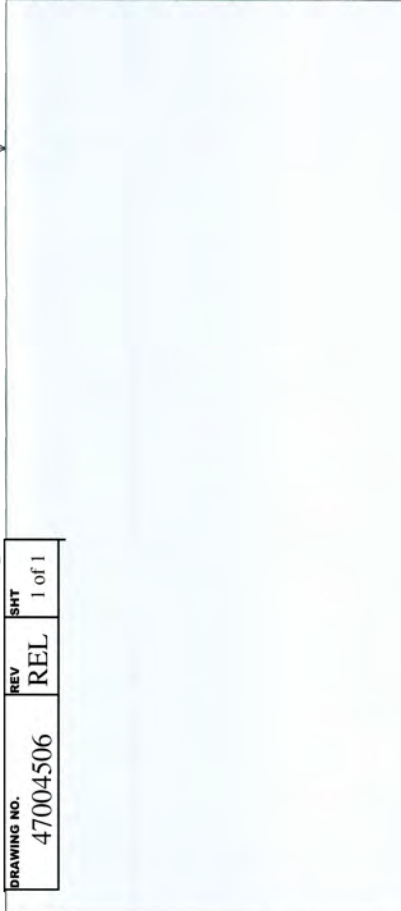
REVISIONS:

REV	DATE	BY	DESCRIPTION
1	10/14/11	JH	PRODM

AS4electronics
 THE WORLD'S BEST KEPT SECRET

REV	DESCRIPTION	BY	REL'D
	RELEASE TO PRODUCTION	CHK	DATE

PARTS LIST			
ITEM	QTY	DESCRIPTION	
1	2	AMP MCP2.8 FLAT TYPE RECEPTACLE	
2	1	AMP MCP2.8, TE P/N: 1-968851-1	
3	2	CONNECTOR, 2POS, AMP MCP2.8, TE P/N: 1-1355200-1	
4	2	SINGLE SEAL, 5.6 mm DIA, TE P/N: 828905-1	
5	2	STRANDED WIRE, 16 AWG, INSULATED SXL/AEXF OR EQUIVALENT	
6	2	Terminal, Male, 250 Type (KET ST40254-1) (Yasaki 71142020)	
7	1	Housing, Female, 2 Terminal, 250 Type (KET MG620042) (Yasaki PN 71222128)	



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- GENERAL STANDARDS UNLESS OTHERWISE NOTED:
 1. TOLERANCE: X ± .060 XX ± .050 XXX ± .010
 2. BREAK ALL EXPOSED SHARP EDGES AND DEBURR.
 3. FOR FLAT PATTERNS ALL INSIDE CORNERS MUST BE WITH .188" R.
 4. FOR FLAT PATTERNS ALL OUTSIDE CORNERS MAY BE ROUNDED UP TO .188" R TO FACILITATE PRODUCTION.

DRAWN	CHECKED	RELEASE NO.
ALL		45440
DATE	DATE	DATE
17JUN15	17JUN15	17JUN15

DO NOT SCALE
 NAME
 HARN PGTL PUMP WSWA 2015
 AM EQUIP #310-1117

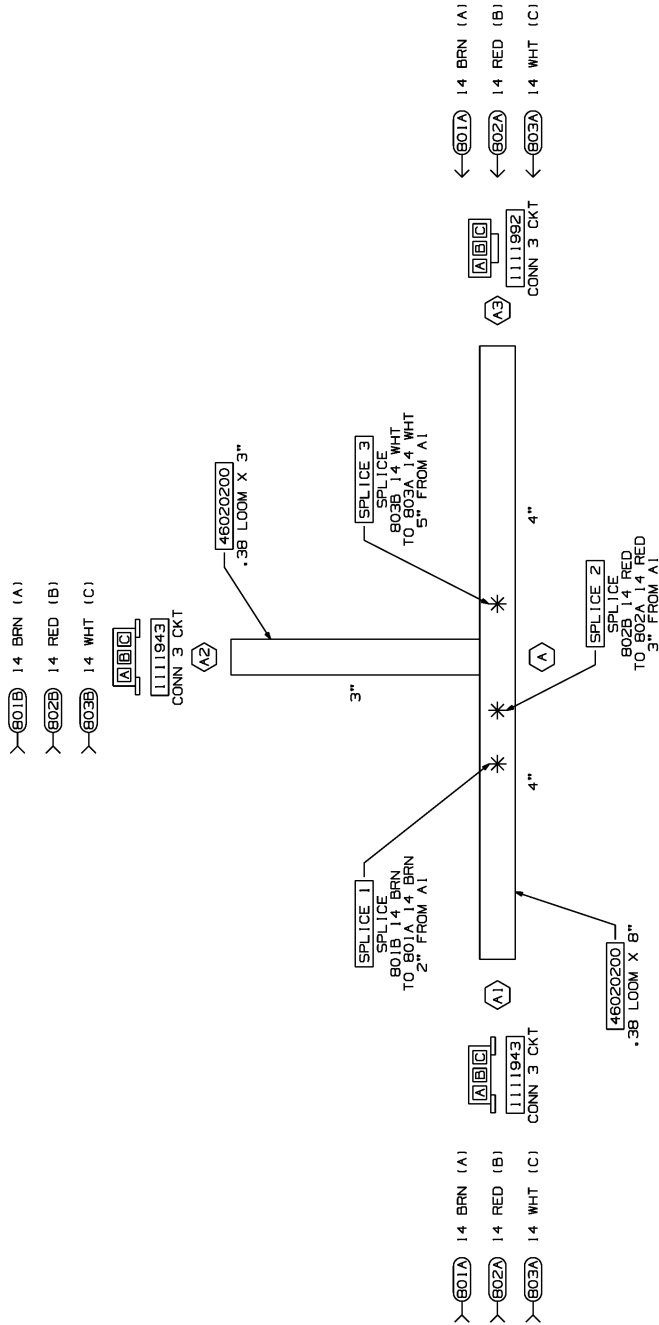
SHT	DRAWING NO.	SCALE
1 of 1	47004506	NONE
REV	REV	REL

DRAWING NO.	REV	SHT
47004506	REL	1 of 1

Project	818-0122	Designed by	Checked by	Approved by	Material Specification	N/A	Finish Specification	N/A
OVALS ARE FOR INCOMING INSPECTION CHECKING PROCESSES UNLESS OTHERWISE SPECIFIED 1 PLACE DEC = N/A ±0.25 2 PLACE DEC = ±0.13 3 PLACE DEC = ±0.08 4 PLACE DEC = ±0.005 ANGULAR DIM = ±1° DO NOT SCALE DRAWING WORK TO GIVEN DIMENSIONS	TOLERANCES IN INCHES 1 PLACE DEC = N/A ±0.25 2 PLACE DEC = ±0.13 3 PLACE DEC = ±0.08 4 PLACE DEC = ±0.005 ANGULAR DIM = ±1° DO NOT SCALE DRAWING WORK TO GIVEN DIMENSIONS	9/6/2013 10/2/2013 10/2/2013	RPA JAS 10/2/2013	RPA 10/2/2013	N/A	N/A	Title Name Wire Harness, KET to 2 MCP, 2 wire, 18", CBL-13452-B-0457	
	THIS DRAWING IS THE SOLE PROPERTY OF AM EQUIPMENT AND CANNOT BE REPRODUCED IN ANY MANNER WITHOUT THE EXPRESS WRITTEN PERMISSION OF AM EQUIPMENT	AM EQUIPMENT Jefferson, Oregon 97352 www.amequipment.com	Part Number 310-1117	Revision 0	Sheet 1 OF 1	Date 10/2/2013	Date 10/2/2013	Part Name Wire Harness, KET to 2 MCP, 2 wire, 18", CBL-13452-B-0457

DRAWING NO.	REV	SHT
88117437		1 OF 1
REV.	DESCRIPTION	BY
	RELEASE TO PRODUCTION	TMC
		DATE

CIRCUIT	DESCRIPTION	END POINTS	FUNCTION
B01A	14 BRN 008 1111944 OE 46018504	A1, A3	GENERIC
B01B	14 BRN 005 1111944 OE STR .25	A2, SPLICE 1	GENERIC
B02A	14 RED 008 1111944 OE 46018504	A1, A3	GENERIC
B02B	14 RED 004 1111944 OE STR .25	A2, SPLICE 2	GENERIC
B03A	14 WHT 008 1111944 OE 46018504	A1, A3	GENERIC
B03B	14 WHT 004 1111944 OE STR .24	A2, SPLICE 3	GENERIC



8. VENDOR MAY REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNESS TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE, UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED AT THE POINTS INDICATED. HEAT SHRINK BUTT SPLICES ARE ACCEPTABLE FOR GO FABRICATION IF NECESSARY.
4. TAPE [1111096]: 6" AT BREAKOUTS AND 2" AT LOOM ENDS.
3. HARNESS TO HAVE A LABEL SHOWING MORGAN OLSON PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
2. SPLIT POLY LOOM UNLESS OTHERWISE NOTED.
1. GXL WIRE.

NOTES:

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GENERAL STANDARDS UNLESS OTHERWISE NOTED: XXXX 1 .010

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. FOR ALL DIMENSIONS ALL HIDE DIMENSIONS MUST BE SHOWN.
3. DIMENSIONS UP TO 1/8" TOLERANCE .005.
4. FOR ALL DIMENSIONS ALL HIDE DIMENSIONS MUST BE SHOWN.

TMC	SEH	02-0241
DATE	28FEB02	28FEB02
DO NOT SCALE		

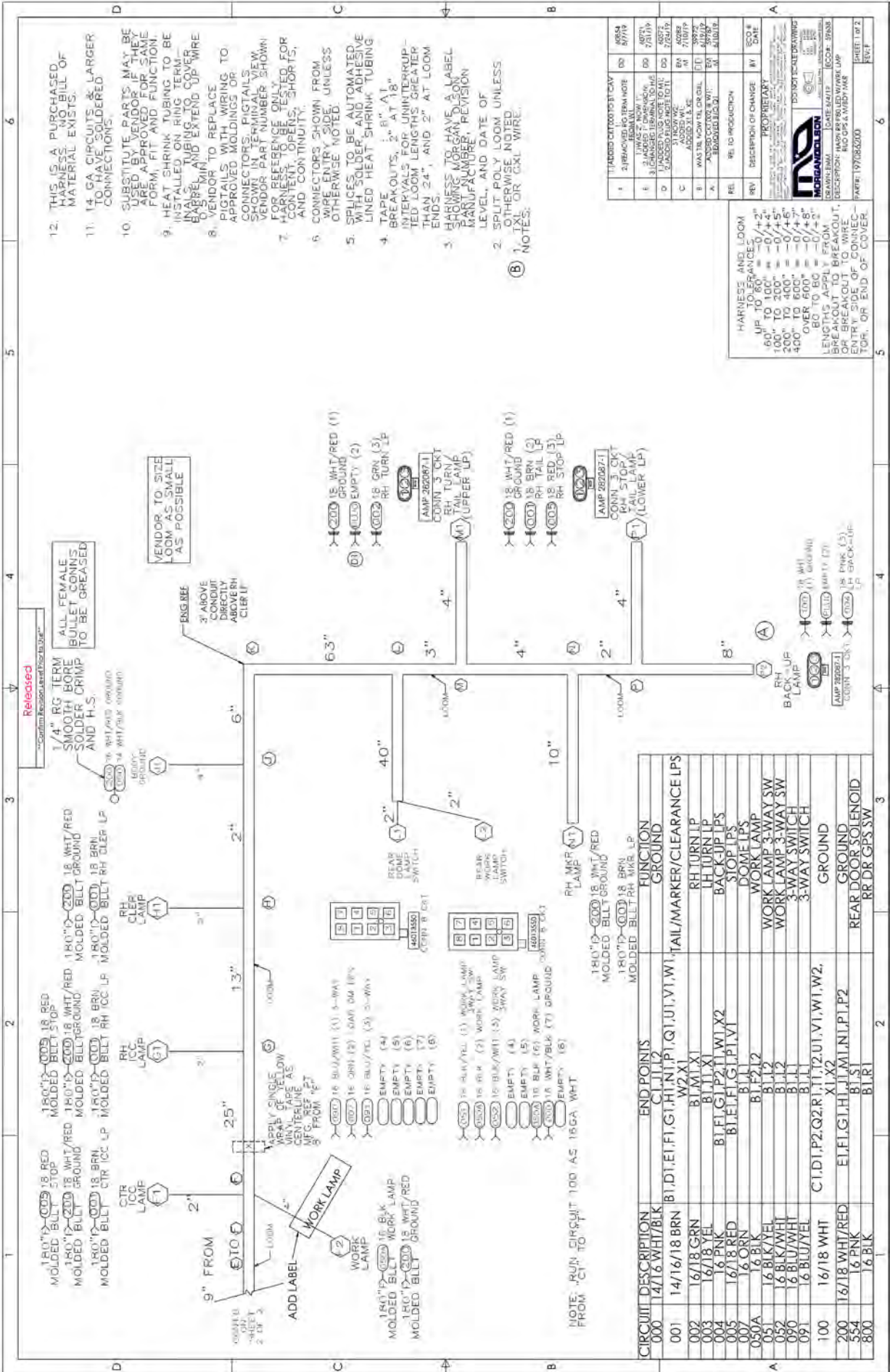
SCALE NONE

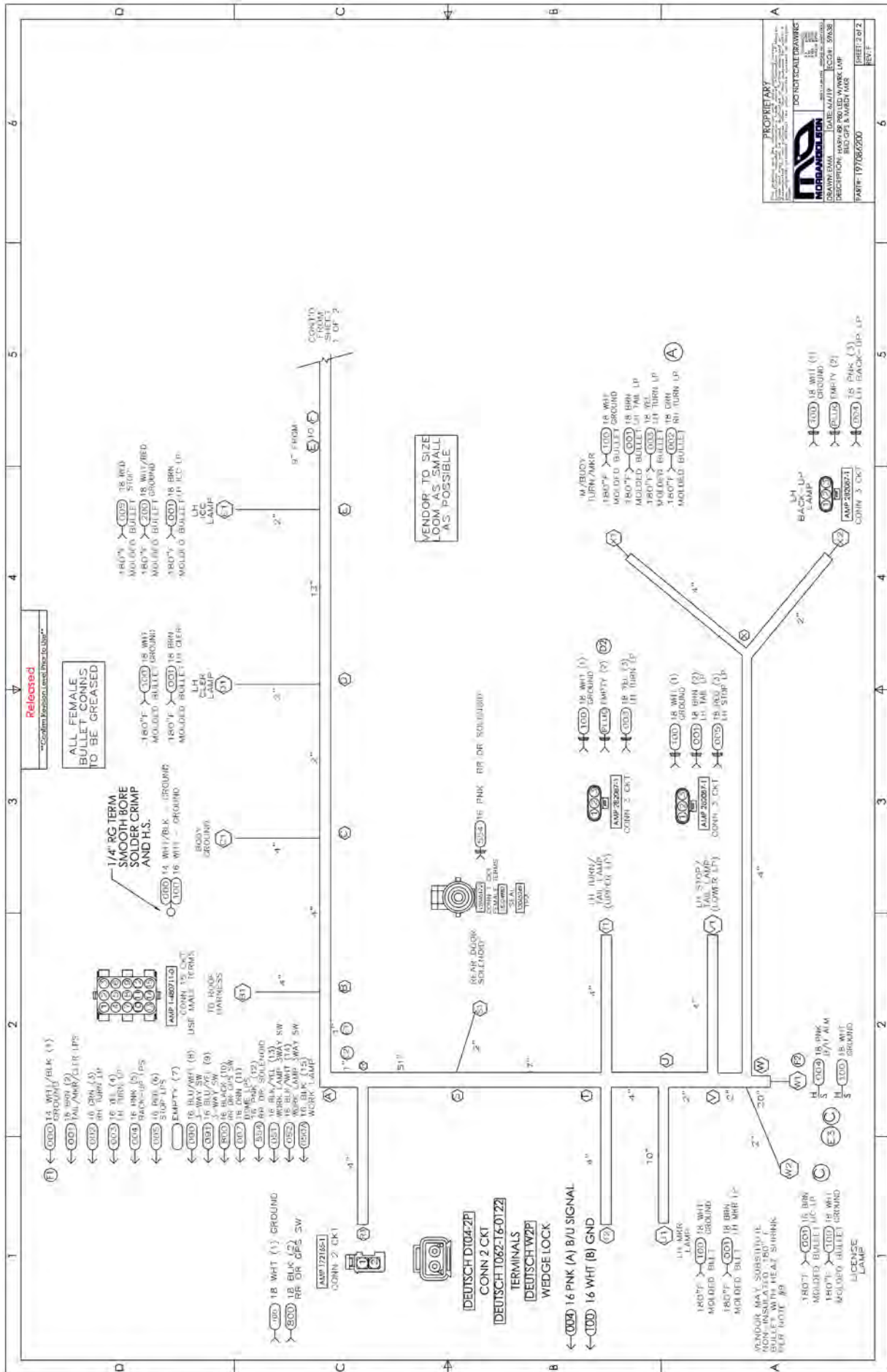
HARNESS AND LOOM TOLERANCES

UP TO 60" = -0/+2"
 60" TO 100" = -0/+4"
 100" TO 200" = -0/+5"
 200" TO 400" = -0/+6"
 400" TO 600" = -0/+7"
 OVER 600" = -0/+8"
 80 TO 80 = -0/+2"

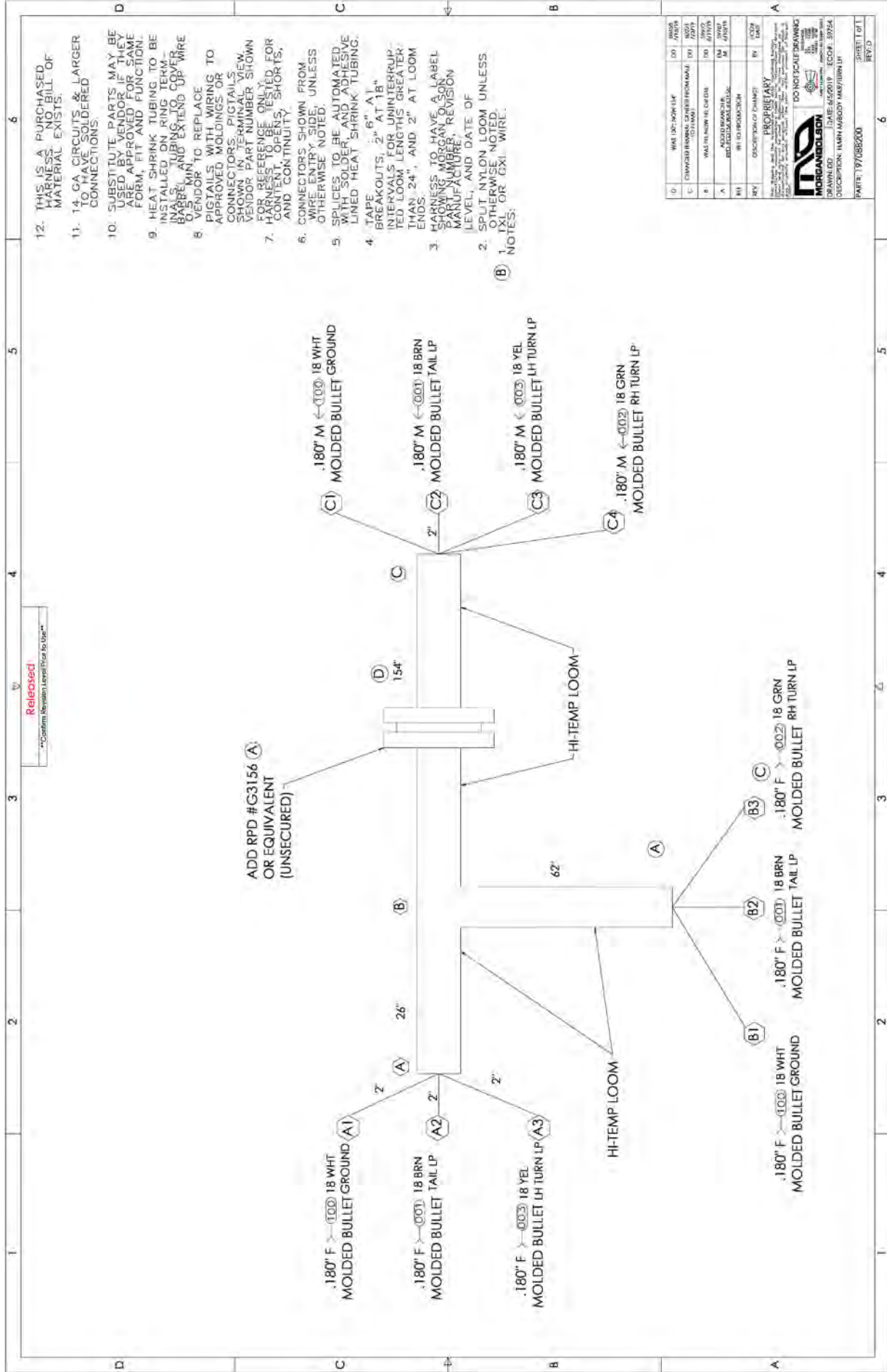
TOLERANCE IS NOT ACCUMULATIVE. LENGTH APPLIES TO OVERALL HARNESS LENGTH, BREAKOUT TO END, OR LOOM.







PROPRIETARY
 DON NOT REPRODUCE OR COPY
 MORGAN OLSON
 DRAWN BY: DATE: 04/19/16
 CHECKED BY: DATE: 04/19/16
 DESCRIPTION: HWY DR PRO LED WORK LAMP
 BLD OPS 1 WASH MER
 PART: 1970862000
 SHEET 2 OF 2
 REV: 1



QTY	WHS	DCI	REF	REV	DATE
1	100	100	100	100	100
2	100	100	100	100	100
3	100	100	100	100	100
4	100	100	100	100	100
5	100	100	100	100	100
6	100	100	100	100	100
7	100	100	100	100	100
8	100	100	100	100	100
9	100	100	100	100	100
10	100	100	100	100	100
11	100	100	100	100	100
12	100	100	100	100	100
13	100	100	100	100	100
14	100	100	100	100	100
15	100	100	100	100	100
16	100	100	100	100	100
17	100	100	100	100	100
18	100	100	100	100	100
19	100	100	100	100	100
20	100	100	100	100	100
21	100	100	100	100	100
22	100	100	100	100	100
23	100	100	100	100	100
24	100	100	100	100	100
25	100	100	100	100	100
26	100	100	100	100	100
27	100	100	100	100	100
28	100	100	100	100	100
29	100	100	100	100	100
30	100	100	100	100	100
31	100	100	100	100	100
32	100	100	100	100	100
33	100	100	100	100	100
34	100	100	100	100	100
35	100	100	100	100	100
36	100	100	100	100	100
37	100	100	100	100	100
38	100	100	100	100	100
39	100	100	100	100	100
40	100	100	100	100	100
41	100	100	100	100	100
42	100	100	100	100	100
43	100	100	100	100	100
44	100	100	100	100	100
45	100	100	100	100	100
46	100	100	100	100	100
47	100	100	100	100	100
48	100	100	100	100	100
49	100	100	100	100	100
50	100	100	100	100	100

PROPERTY OF MORGAN OLSON
DO NOT SCALE DRAWING
DATE: 04/20/2019
DESCRIPTION: HARNESS BODY ASSEMBLY
DRAWN: JLD
DATE: 04/20/2019
ECN: 197564
PART: 197086200
SHEET 1 OF 1
REV: D

CIRCUIT 000	DESCRIPTION 14 WHT	END POINTS A,B	FUNCTION GROUND
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DRAWING NO. 131493205	REV	SHT 1 OF 1
DESCRIPTION RELEASE TO PRODUCTION	REV	SHT

8. VENDOR MAY REPLACE PIGTAILS WITH WIRING TO APPROVED MOLDINGS OR CONNECTORS. PIGTAILS SHOWN IN TERMINAL VIEW.
7. HARNESS TO BE TESTED FOR CONTENT, OPENS, SHORTS, AND CONTINUITY.
6. CONNECTORS SHOWN FROM WIRE ENTRY SIDE UNLESS OTHERWISE NOTED.
5. SPLICES TO BE AUTOMATED WITH SHINK BEING WITH PERMITS. SPLICES ARE ACCEPTABLE FOR M-O FABRICATION IF NECESSARY.
4. TAPE [1111096]: 6" AT BREAKOUTS AND 2" AT LOOM ENDS.
3. HARNESS TO HAVE A LABEL WITH TO ORGANIZATION PART NUMBER, REVISION LEVEL, AND DATE OF MANUFACTURE.
2. SPLIT POLY LOOM UNLESS OTHERWISE NOTED.
1. GXL WIRE.

NOTES:

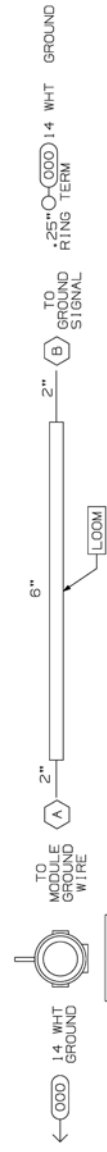
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GENERAL STANDARDS UNLESS OTHERWISE NOTED: 1. ANGLES: 90° UNLESS OTHERWISE NOTED. 2. DIMENSIONS: UNLESS OTHERWISE NOTED. 3. DIMENSIONS: UNLESS OTHERWISE NOTED. 4. DIMENSIONS: UNLESS OTHERWISE NOTED.

DATE	14 JAN 14
TIME	DO NOT SCALE
SCALE	NONE
DRAWING NO.	131493205
SHT	1 OF 1

DRAWING NO.	131493205
SHT	1 OF 1
SCALE	NONE
REV	



HARNESS AND LOOM TOLERANCES
 UP TO 60" = -0/+2"
 60" TO 100" = -0/+4"
 100" TO 200" = -0/+5"
 200" TO 400" = -0/+6"
 400" TO 600" = -0/+7"
 OVER 600" = -0/+8"
 BO TO BO = -0/+2"
 BO TO BO = -0/+2"
 TOLERANCE IS NOT ACCUMULATIVE. LENGTH APPLIES TO OVERALL HARNESS LENGTH, BREAKOUT TO END, OR LOOM.