



# Instructions for Converting a 2016-2018 Global MX-5 Cup Car to 2019 Specification


## Notes and Considerations

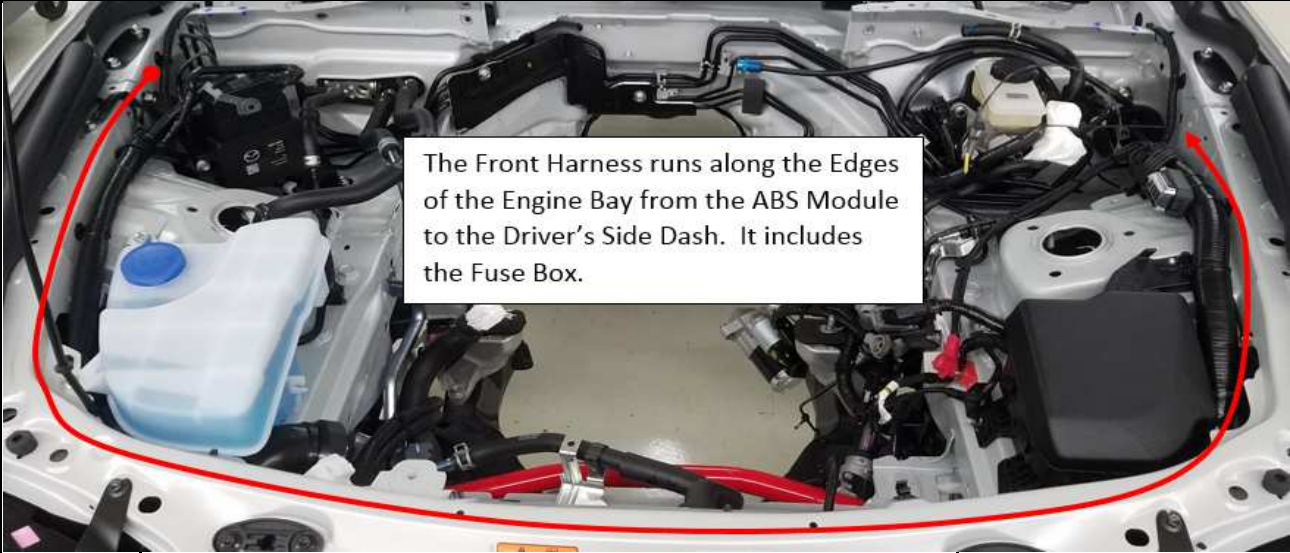
1	Follow all Factory Torque Specifications, and Shop Safety Standards
2	It is recommended to Install all Metal to Metal Screw Connections with Medium Loctite unless otherwise specified, or Lock Nuts are in use.
3	The time noted for each step is man hours in minutes for planning purposes. Most tasks can be completed by one person, but some things will be much easier with two people.
4	Refer to Parts List Appendix to Ensure you have Received all Necessary Parts
5	Total estimated time to complete: 60 hours


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Step	Task	Picture	Time (minutes)
Step 1.0	Remove Transmission and Engine		240
1	Disconnect Battery		
2	Remove GEMS ECU Cover, ECU and Bracket. Keep 1 of the M8 Flange Bolts for Installation of the New Adaptor Box.		
3	Remove Red Strut Tower Brace		
4	Remove Interior Center Console and Shift Lever		
5	Remove Under Body Bracing		
6	Drain Transmission Fluid, Remove Cooler Lines & Plug Both Holes		
7	Disconnect Rear O2 Sensor and Remove Mid Pipe		
8	Support Transmission and Remove Power Plant Frame and Drive Shaft.		
9	Remove Clutch Line, Starter and Transmission Harness		
10	Remove Front Bosch 2016 Spec LSU ADV O2 Sensor and Unbolt Header		
			
11	Remove Transmission		
12	Remove Front Bumper Cover and Wheel Liners		
13	Drain Engine Coolant and Remove Overflow Tank		
14	Remove Air Filter Box		
15	Disconnect Engine Harness From Fuse Box		
16	Disconnect Alternator wiring, Unbolt Power Cable on Power Post		
17	Unclip Starter Harness from Engine		
18	Disconnect Fuel Line, Vacuum Line and EVAP Line		
19	Remove Wipers, Plastic Cowl Cover, and Metal Air-Cowl Panel that Strut Tower Brace Attaches to		
20	Remove Upper Radiator Hose		
21	Remove Front and Rear Heater Core Hoses		
22	Remove Lower Radiator Hose		
23	Drain Engine Oil		
24	Remove Cooler Lines from Oil Sandwich Plate		
25	Attach Engine to Hoist and Remove Top Nut From Engine Brackets on Both Sides.		
26	Remove Engine		
Step 2.0	Transfer Parts from 2016 Engine to 2019 Engine		150
1	Remove 2019 Clutch and Dual Mass Flywheel from 2019 Engine, These Not Used.		






2	Transfer 2016 Clutch and Flywheel.	
3	Remove 2019 Oil Filter Housing and OEM Oil Cooler (Discard), then Transfer 2016-18 Oil Filter Housing to New Motor, Use Provided New Gasket	
4	Remove Short Rear Coolant Hose from OEM Oil Cooler (Discard), Use Long Front Hose to Bypass Coolant Back to the Block.	
		
5	Transfer Left and Right Engine Brackets	
6	Transfer Fuel Port Assembly	
7	Transfer Alternator, AC Compressor, Tensioner and Belt	
8	Transfer Exhaust Header Gasket	
9	Zip Ty Both Ends of PCV Hose	
10	Drain Factory Oil	



<b>Step 3.0</b>	<b>Remove Front Harness from Engine Bay</b>	60
 <p>The Front Harness runs along the Edges of the Engine Bay from the ABS Module to the Driver's Side Dash. It includes the Fuse Box.</p>		
1	Disconnect 9 Connectors Under Drivers Side Dash	
2	Pull End of Harness Through Firewall Opening	
3	Remove Washer Fluid Reservoir	

4	Starting From Driver Side, Disconnect:	
	Side Marker Light	
	2 Connectors From Brake Booster/Master Cylinder	
	3 Nuts on Fuse Box	
	2 Grounds Under Fuse Box	
	LF Wheel Speed Sensor Connector	
	LF Head Light	
	1 Gang Ground Under Head Light	
	1 Connector in Front of Hood Release, Dummy Connector Can Be Removed.	
	1 Temperature Sensor under Bumper Brace	
	4 Connectors on Radiator Fan (Leave Steering Rack Harness)	
	Ground on Cross Brace	
	2 Connectors Under Washer Fluid Bottle	
	RF Wheel Speed Sensor Connector	
	1 Ground Under Washer Fluid Bottle	
	RF Head Light Connector	
	Vacuum Pump Connector	
	1 Ground Above RF Damper	
	1 Large Connector for ABS Module	
	1 Large Connector for Vacuum Pump Controller	
5	Remove Front Harness	

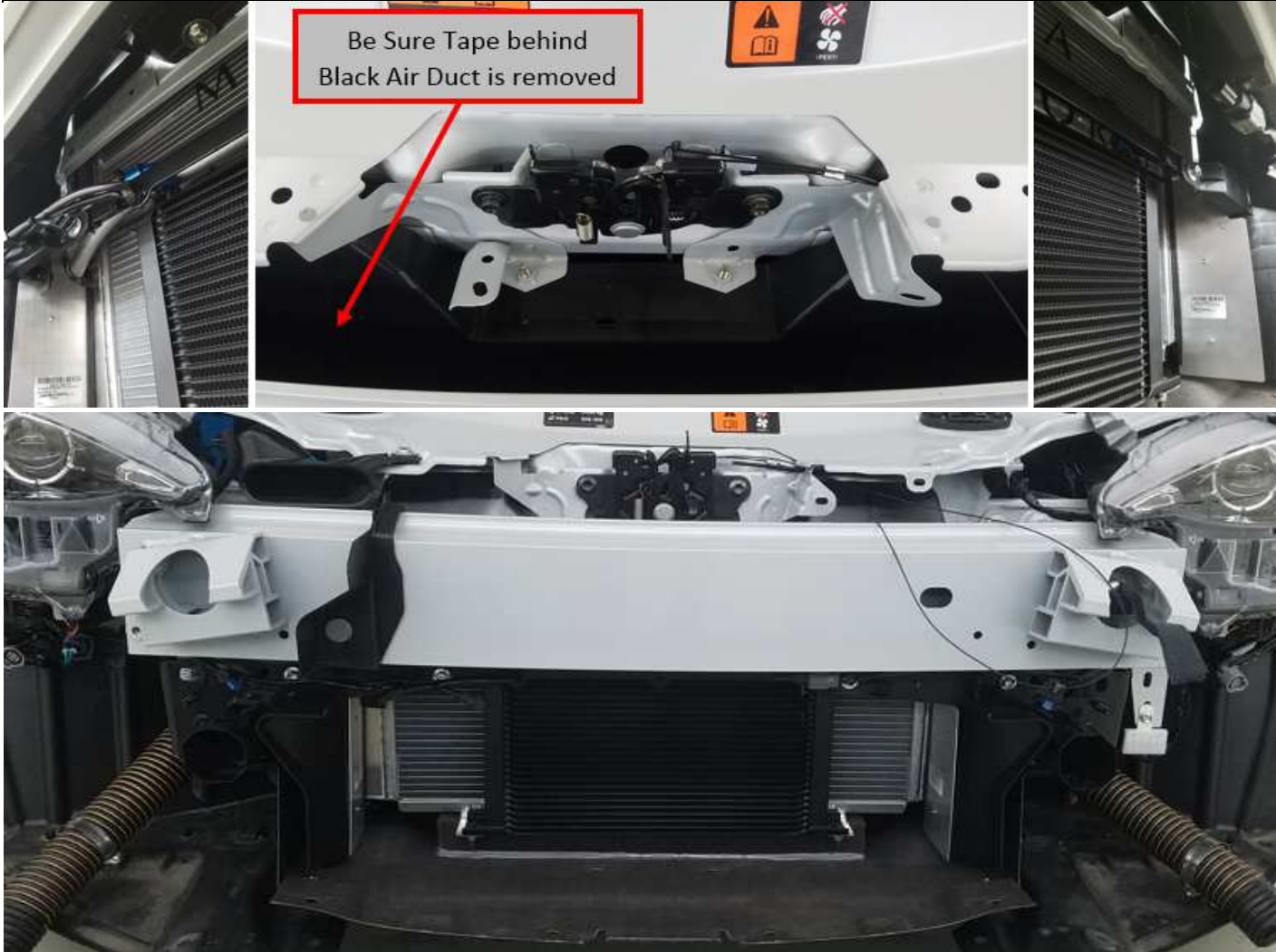
<b>Step 4.0</b>	<b>Install 2019 Front Harness</b>		60
1	Reconnect Connectors from Step 3, Except Leave the End With the 9 Connectors Under the Dash Uninstalled Until Ready to Route the New Power Cable and ECU Adaptor Harness.		
2	Reinstall the Windshield Washer Fluid Reservoir		
3	Leave End with 9 Connectors at Driver Side Firewall Out in Engine Bay Until the ECU Adaptor is Installed Below.		
4	Note that the Lower Temperature Sensor in the Lower Radiator Hose is no Longer used and Will Remain Unplugged.		
5	Remove Red Plastic Housing from Main OEM Power Wires and Straighten 90 Degree Terminal on the Wire that goes to the Fuse Box Similar to Wire on the Harness that was removed.		



<b>Step 5.0</b>	<b>Remove and Replace Radiator and Engine Oil Cooler</b>		120
1	Apply 1/2"x1/4" Foam Around Outer Edges on Back of the New Engine Oil Cooler		
			
2	Attach Two New Engine Oil Cooler Brackets to New Radiator:		
	Temporarily Attach the Engine Oil Cooler Brackets to the Oil Cooler with 1 M6x16 Flange Bolt and 1 M6 Flange Nut on Each Side as Shown to Properly Space Brackets		
	Center the Oil Cooler Between the Radiator Tanks, Align the Top Edge of the Engine Oil Cooler Brackets with the Bottom of the Radiator Core and Mark Bracket Locations on the Radiator's Bottom Flange. 3.75" from Cooler Tank to Radiator Header		
	Remove Brackets From Oil Cooler and Mark the 4 Hole locations on the Radiator's Bottom Flange. Drill Four 1/8" Holes in the Bottom Flange of the New Radiator to Match the Spacing of the Holes in Oil Cooler Brackets when they are Attached to the Oil Cooler. 2-1/2" from Edge of Core to Edge of Bracket, 14-1/8" from Inside Edge to Inside Edge of Brackets		
	Attach the Engine Oil Cooler Brackets with the Included 1/8" Rivets		
			
3	Remove 2016 Spec Engine Oil Cooler and Oil Cooler Lines		


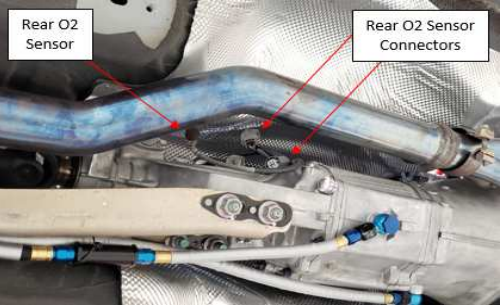

4	Remove the Left and Right Radiator Ducting Panels, Save Rubber Edging for New Panels	
5	Remove 2016 Spec Radiator	
6	Remove All Gaffer's Tape Covering Holes and Ducting in Nose of Car. <u>No Tape Allowed for the 2019 Spec Car!</u>	
7	Route New Grey Engine Oil Cooler Lines, Long Line to the Back, Similar to Old Black Lines.	
8	Transfer Radiator Mounting Bushings from Old Radiator to New Radiator	
9	Transfer Radiator Fan from Old Radiator to new Radiator: Slide Fan Into Tabs on Back of new Radiator, Mark and Drill 1/8" Holes on Top Lip of Radiator, Secure with 1/8" Rivets.	
10	Transfer Top Flap Seal from Top Lip of Old Radiator to New Radiator. Note, Bulb Seal on Bottom of Radiator Does Not Transfer.	
11	Install New 2019 Spec Radiator. 2019 Radiator has 2-9/16" Thick Tanks, 2016 Spec Radiator has 1.75" Thick Tanks.	
12	Connect Coolant Hoses and Electrical Connectors	
13	Connect Engine Oil Cooler Lines to 2019 Spec Engine Oil Cooler	
14	Install 2019 Spec Oil Cooler with 1 M6x16 Flange Bolt and 1 M6 Flange Nut In Each Bracket. Secure the Top with the Provided Zip Ty's and Plastic Tubing: Feed the Zip Ty around the Cooler Fittings, Through the Tubing and Around the Cross Brace in the Same Manner the Old Cooler was Attached. Cut Tubing Length Such that the Foam on the Oil Cooler is Pushed Lightly Against the Radiator Core, Ensuring that the Oil Cooler Can Not Bounce and Damage the Radiator.	


15	Install 2019 Radiator Ducting Panels with Rubber Edging in Same Manner as Old Panels. (The New Panels are 3/8" Narrower to Allow for the Bigger Radiator). The Same Holes Should Line Up for Attaching with two 1/8" Rivets on Each Side. Ensure that Ducting Edges are flush against the Radiator Tanks. Adjust Holes if Needed, <u><a href="#">NO Sealing Tape Allowed for 2019 Spec.</a></u>	
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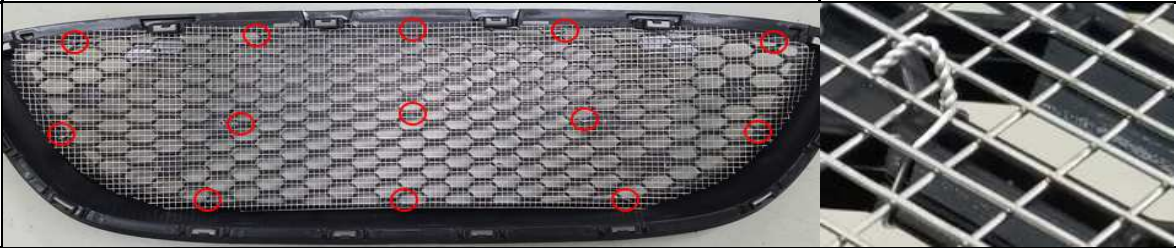


<b>Step 6.0</b>	<b>Install 2019 Engine; Refer to Factory Torque Spec and Shop Safety Standards</b>	240
1	Install 2019 Spec Engine with Items Transferred in Step 2.0 Above.	
2	Re-Install Transmission and Drive Shaft	





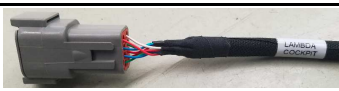
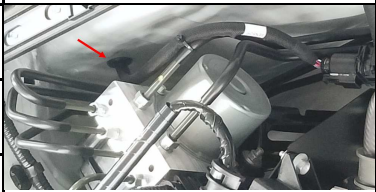
	3	Re-Install Exhaust Header and Mid-Pipe with New 2019 Spec Bosch LSU 4.9 O2 Sensor in the Front O2 Location. Route O2 Connector up Transmission Tunnel to Engine Bay and Secure Near ABS Unit	
			
	4 (new Rev 6)	The Rear O2 Sensor is Not Functional and it's Connector No Longer Matches the Engine Harness. You May Tie Up Each End of the Wires Without Connecting them, or You May Remove the O2 Sensor and Replace with a Standard Exhaust Plug.	
			
	5	Re-Install Underbody Braces and Belly Pan	
	6	Re-Install Strut Tower Brace	
	7	Note that the Air Intake Temperature Sensor on the Air Box Will Remain Disconnected	

<b>Step 7.0</b>	<b>Update Front Bumper Mesh</b>		45
1	Trim 8 Posts on 2019 Plastic Grill Insert with Flush Cuts		
			



2	Attach 1/4" Mesh Metal Radiator Screen to Inside Surface of 2019 Plastic Grill Insert. Use Safety Wire to Secure in at least 13 places as shown.	
		
3	Remove 6 Screws and 2 Plastic Push Screws from Stock Front Bumper Mesh in Front Bumper Cover	
		
4	Remove Front Bumper Mesh by Lifting Tabs Surrounding the Insert	
5	Snap New 2019 Front Bumper Grill/Mesh Assembly into Place in Front Bumper Cover	
		
6	Reinstall Front Bumper Cover on Car	

<b>Step 8.0</b>	<b>Update Dash Switch Panel: Add Fuel Map and Fuel Reset Switches</b>		30
<b>There are two options for updating the Switch Panel:</b>			
<b>8A</b>	Option A) Unassembled Wiring Update: Requires Drilling Two Holes in Switch Panel and Installing Prewired Switches.		
1	Using Provided Template, Mark Hole Location on Dash Panel		
2	Drill Two 15/32" Holes Taking Extra Precaution Not to Hit the wires on the Existing Switches.		

	3	Install Fuel Reset and Fuel Map Switches as Shown. The Contacts on the Fuel Map Switch Should be Open when set to 100 Octane, and Closed when set to 93 Octane.		
		 		
	4	Install Provided Labels for the New Switches as Shown Above		
8B		Option B) Preassembled Wiring Update: Includes Fully Assembled Switch Panel to Replace Old Panel.	This Option Should Be about 15 minutes Quicker	15
	1	Drill out 5 Rivets Around Perimeter of Switch Panel, Disconnect and Remove Panel. 4 Deutsch Connectors and 2 wires on the Main Power Switch must be Disconnected.		
	2	Transfer 2 wires and Connect Deutsch Connectors on New 2019 Switch Panel and Install with Black Rivets Provided.		
<b>Step 9.0</b>	<b>Route O2 Sensor Extension Through Firewall</b>			45
	1	Remove O2 Extension From ECU Adaptor Harness by Disconnecting the 6 Pin "Lambda Cockpit" DTM.		
	2	De-pin the 6 Pin DTM from the O2 Extension, Labeled Lambda Cockpit. Take Precaution to Mark the Like Color Wires to Ensure they are Reconnected Properly		
	3	Route the O2 Extension Wire Through the OEM Hole Directly Behind the ABS Controller on the Firewall. Sealing Tape Will Need to be Removed. Push the DTM End with the Connector Removed from the Engine Bay Into the Cockpit Leaving Approximately 12" of the Wire with the Bosch O2 Connector in the Engine Bay.		
	4	Plug the Bosch Connector into the new Bosch LSU 4.9 O2 Sensor Connector and secure wires.		
	5	Make Sure the Wire is Protected by the Provided Grommet at the Firewall		
	6	Re-pin the 8 Pin DTM Connector and Leave in the Right Side Footwell		

7	Bosch Pin	Bosch Color	DTM Pin	DTM Color
	1	Red	1	Red
	2	Red	2	Red
	3	White	4	White
	4	Red	5	Red
	5	Blue	6	Blue
	6	Blue	7	Blue
			3	Green (paired with red pin 1)
			8	Green (paired with red pin 8)

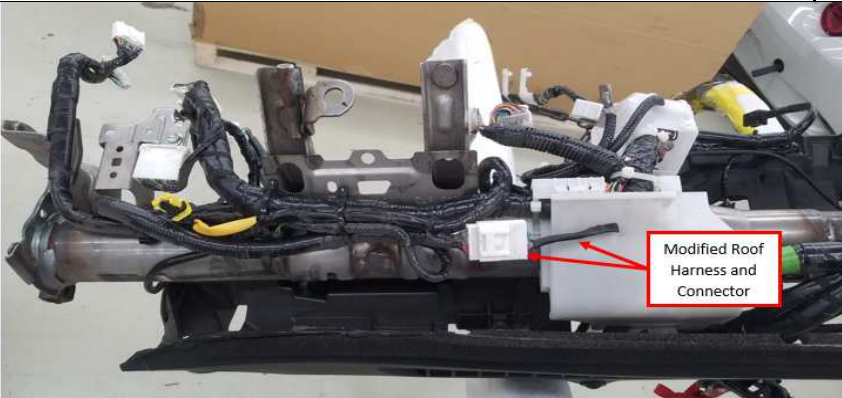



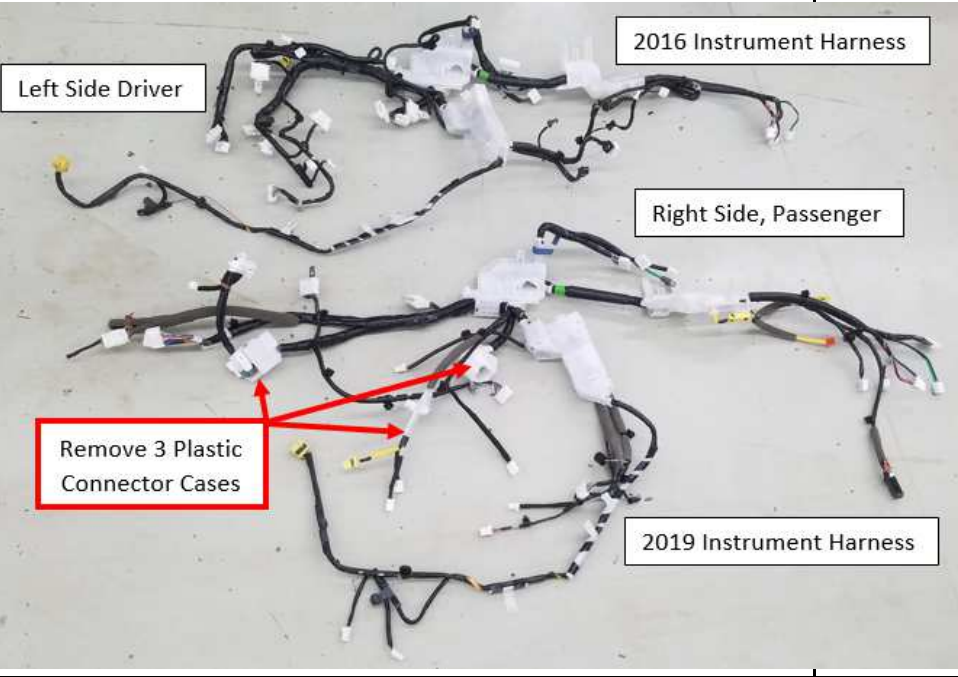
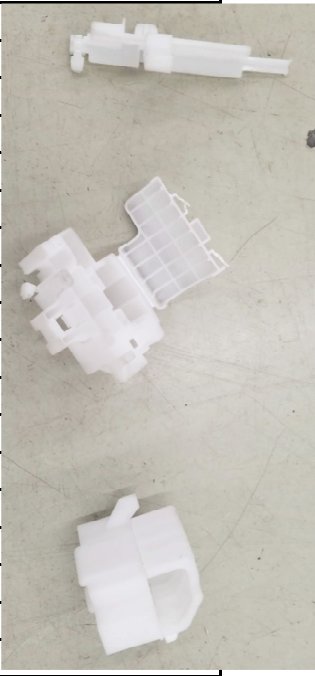
In the 8 Pin DTM The Green Wires are grouped with a red wire and a blue wire.

The Green Wire grouped with the red wire that goes to pin 1 in the DTM goes to pin 3.


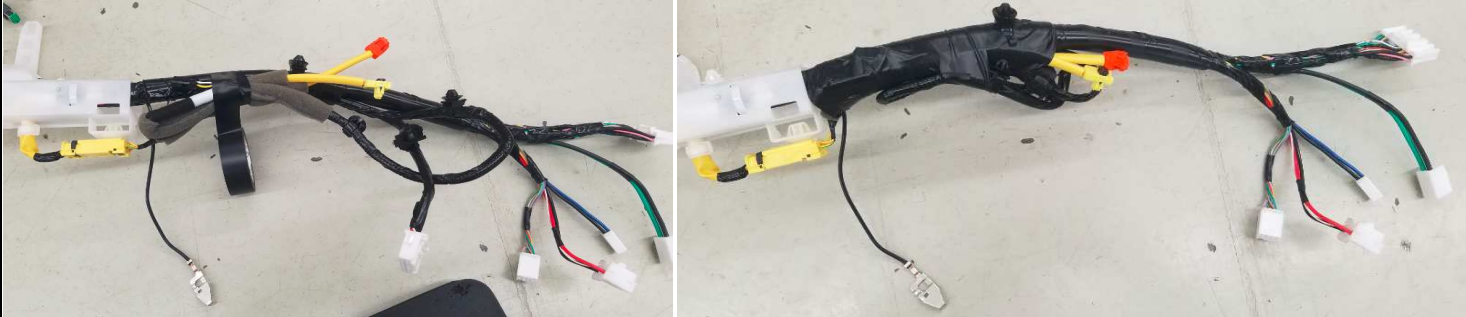

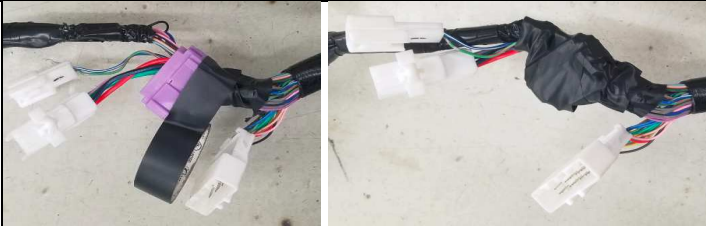

The Green Wire grouped with the red wire that goes to pin 2 in the DTM goes to pin 8



### For 2018 VIN Numbers with Last 6 Digits >200000 Skip to Step 11.0



Step 10.0	This Step is Only for 2016-2017 Cars with the Last 6 Digits of the VIN <200001. Remove Dash, Remove and Replace Instrument Harness and Body Control Module.		240
1	The Instrument Harness is the Wiring Harness that runs along the Dash Bar. Remove Dash to Replace this Harness. It is Recommended to Remove the Windshield Prior to Removing the Dash. Later cars with Last 6 Digits of VIN Numbers greater than 200000 do not Require the Instrument Harness or Body Control Module to be changed.		
2	With Dash Out, Take Photos of Existing Instrument Harness Installed to Help Replicate Similar Installation of New Harness.		





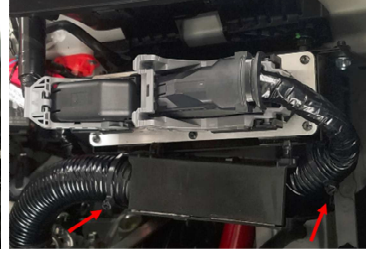


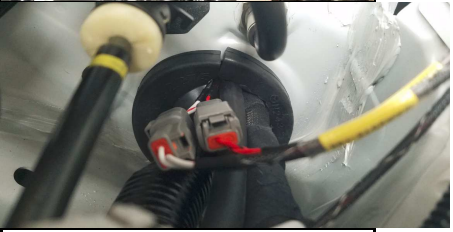
3	Transfer the Short Modified Roof Harness Connector from the Driver's Side of the Old Instrument Harness to the 2019 Harness.	
		
		
4	Remove 3 Plastic Connector Cases from 2019 Instrument Harness Before Installation.	
		










5	Tape over all foam wrapped wires with electrical tape.	
		
6	Secure Unused Connectors/Wires on Right Side with Electrical Tape.	
		
7	Secure Unused Connectors/ Wire on Left Side with Electrical Tape	
		
8	Secure Unused Purple Connector	
		
9	Trim Tabs on 1 Plastic Harness Casing and Secure with zip tys Due to the Dash Bar Reinforcement Interference with the Tab Holes.	
		

10	Install 2019 Harness into Dash Assembly.	
		
11	Remove and Replace Body Control Module with 2019 Body Control Module (Left Side Under Dash)	
		
12	Reinstall Dash Assembly	




<b>Step 11.0</b>	<b>Install ECU Adaptor Harness, and Connect OEM Front Harness</b>	180
1	Install ECU Adaptor Mount A with 2 Factory M6 nuts on the Studs on Side of Fusebox Where GEMS ECU was Mounted 	



2	Place ECU Adaptor Capture Mount B over Adaptor Box Secured with Dual Lock	
		
		
		
3	Attach ECU Adaptor and Mount B to Mount A with 2 M6x12 Serrated Flange Bolts. Use 1 M8 Flange Bolt from the GEMS ECU Mount in the Bottom Leg of Mount B Next to Overflow Hose	
4	Route Main Harness Wire Toward the Back of the Car Along Main Power Cable and Factory Front Harness. Plug ECU Connectors in and Secure Wiring Harness to ECU Adaptor Bracket With Zip Tys.	
		
		
5	Feed the ECU Connectors Through Large Opening in Drivers Side Firewall.	
6	Trim Rubber Grommet on 2019 Factory Front Harness to Make Room for Main Power Cable and ECU Adaptor Cable	
7	Feed 2019 Factory Front Harness Through Firewall Opening, Ensure that Main Power Cable, ECU Harness Adaptor Wire, Cowl Kill Switch Wiring, and Alternator Wiring are all Protected in the Front Harness Grommet	
8	Route ECU Adaptor Harness Wire Under the Dash, Over the Transmission Tunnel to the Right Side Footwell	



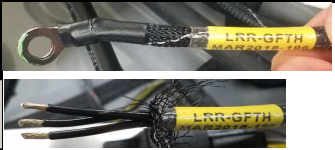





9	Connect 9 Connectors on 2019 Front Harness Under Drivers Side Dash	
10	Unplug the 4 pin DTM Connector on the AiM MXL2 Harness for Power and CAN Connection from the OBDII Power Connector. The OBDII Connector is No Longer Used and Can be Removed if Desired.	
11	Plug the 4 Pin AiM DTM Connector Into the 4 Pin AiM CAN Connector on the ECU Adaptor Harness.	
12	Plug the 3 Pin Dash Inputs Connector on the ECU Adaptor Harness to the 3 Pin LRR-FMR Connector on the Fuel Map and Reset Switches that were Added to the Switch Panel	
13	Plug the 8 Pin DTM Labeled Lambda Interface into the 8 Pin Lambda Cockpit Connector on the O2 Extension	
14	Drill 13/16" Hole in Right Side Dash for Bosch ECU Communication Port. Template Provided.	 
15	Install Bosch ECU Communication Port.	
16	Install Bosch ECU Bracket Assembly Under Right Side Dash with 3 M6 Nuts on 2 Factory Studs on Dash	 




		
17	Remove 3 M6 Bolts to Remove ECU Capture at Bottom of Bracket and Install Bosch MS6 Cup ECU, Snap it Into Place at top of Bracket with Dual Lock and Reinstall Bottom Bracket Capture.	
		
17	Route +12V, and GND Wires on ECU Adaptor Harness with Main Chassis Harness on the Left Side Transmission Tunnel near the Right Rear Damper. Final Routing and Connection for this is completed in the Aftermarket Wiring Updates section.	
		
18	Secure Excess Wiring Under Dash and Reinstall Dash Cover Panel	
19	Secure All Wiring in Engine Bay	

<b>Step 12.0</b>	<b>Aftermarket Wiring Updates and Firebottle Relocation</b>		300
<b>Notes:</b>	The Aftermarket Wiring Updates Include: Updating All Battery Cables, Adding a Circuit Breaker to the Power Panel, and Extending Grounds to Reach the New Cage Ground Stud.		
<b>There are two options for updating the Aftermarket Wiring Harness:</b>			
	Option A) Unassembled Wiring Update: Requires Transferring Relays and Solenoid from Old Power Panel to new and Extending two Ground Wires.		
	Option B) Preamsembled Wiring Update: Includes Fully Assembled Power Panel with Extended Grounds and all Updates Installed.	This Option Should be Approximately 80 minutes Quicker	
1	Remove Power Distribution Panel		
2	Remove Fuel Neck and Vent Tube from Gas Tank Inlet		
3	Remove Tank Inlet Cover, Center and Right Side Rear Firewall Panels.		
4	Trim Center and Right Side Firewall Panel Notches for Larger Wires, Template Provided		
			
5	Remove Fire Bottle From Trunk		
6	Weld M8x20 Ground Stud on Right Rear Down Bar, Full Penetration is Important to Ensure Good System Ground, Ensure Ground Surface Remains Clean and Free from Touch Up Paint. Protect Threads and Ground Surface with Dielectric Grease		
7	Remove Original Power Cable and Replace with Larger 2019 spec Cable, (Do Not Attach to Power Distribution Panel Yet)		
8	Remove Firebottle Lines from Trunk		
9	Trim 30" from the Long Driver's Side Dash-to-Rear Firewall Firebottle Line and Install Tee-Fitting ~6" to the Right of the Transmission Tunnel.		
10	Install 12" Firebottle Line in Middle Port of Tee-Fitting (make from piece trimmed above)		
11	Install 52" Firebottle Line in Remaining Port of Tee-Fitting, Route Back to Trunk, Install Nozzle and Point at Gas Tank Inlet.		

		
12A	Transfer Components from Old Power Distribution Panel to New Longer Panel with Circuit Breaker.	
12B	If Preassembled Wiring Harness was Purchased, Remove 2016 Old Power Distribution Panel (Including Diff/Trans Pump and Fan Wiring), Replace with the new 2019 Spec Power Panel Assembly and Skip to Step 16.	
		
13	Remove 18ga Ground Wire from 4pin DTM Connector and Replace with Longer 19" Version Included with Kit.	
14	Trim the 1/4" Ring Terminal off of LRR-GTFH, Remove the Heat Shrink to Expose The 3 Ground Wires and Strip 1/4" From Each End	
15	Crimp the Butt Connector of the 6" Ground Wire Extension Included with the Kit onto the 3 Exposed Ground Wires; Secure and Protect the Connection with the Provided Heat Shrink	
		
16	Using the M8 Flange Nut with Lock Washer, Connect the 2 Power Panel Grounds, the New Main Battery Ground with Quick Disconnect and the GND Wire from the ECU Adaptor Harness to the Ground Stud, Protect Connection with Dielectric Grease.	
16.1	Route +12V Wire with Fuse Block from ECU with Main Power Cable through Rear Firewall .	


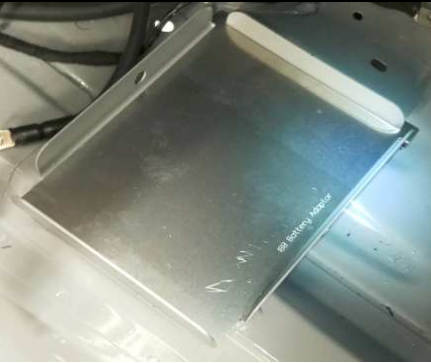
17	Reroute Firebottle Wiring from Trunk to Harness Bar Near the New Tee-Fitting at the Rear of Transmission Tunnel	
18	Reinstall Modified Rear Firewall Panels, Protect Wires that Pass Through with Rubber Edging or Grommets. Main Power Cable, Firebottle Hose and ECU Adaptor +12V Pass Through Middle Section, All Others Through Right Side Panel	
19	Apply Foam Along Top and Bottom of New Power Panel on Back Side	
20	Install New Power Panel in Same Manner as Old Panel	
21	In Lower Left Corner of Power Panel, Drill 1/4" Hole Through Firewall and Secure with an Additional M6x16 Flange Bolt and Flange Lock Nut (Provided)	
22	Connect Battery (+) after Quick Disconnect to Bottom of Circuit Breaker	
23	Connect Short Jumper from Top of Circuit Breaker to Right Side of Solenoid	
24	Connect Power Cable from Engine Bay and ECU Adaptor +12V to Left Side of Solenoid. Attach Fuse Block with Dual Lock to Firewall Under Power Panel. Make sure 25A fuse is installed.	
25	Remove and Discard Secondary Ground Cable from Trunk Latch	
		
26	Reinstall Fuel Fill and Vent Hose	
27	Secure all Wires and Cables, Ensure All Hot Connections are Properly Insulated	



28	Apply Aluminum Tape Over the Old Firebottle Mounting Holes		60
29	Install Battery Cable Harness with Quick Disconnect on Battery. Use Terminal Protectors on All Positive Connections. Connect two Quick Connects Together.		
30	Install Battery With Updated Battery Capture and Wing Nuts. Use loctite or lock washers.		
31	Apply Dual Lock to Quick Connect and Secure to Right Rear Frame Rail		
32	Disconnect Quick Connect Until Remaining Work Items are Completed		
33	Loosely Install New Fire Bottle Bracket on the Harness Bar, 12" from the End on the Passenger Side Using the 3 Hose Clamps Provided in the Kit		
34	Loosely Install Firebottle on Bracket with Existing Firebottle Clamps		
35	Apply Foam on Car where the Firebottle Will Rest		
36	Adjust Firebottle so Connections are Facing Toward the Front of the Car		
37	Tighten the Firebottle Clamps and Bracket Clamps		
38	Connect 12" Fire Bottle Line from Tee-Fitting and Newly Routed Electrical Connection		
39	Tie Up Loose Power Cable and Firebottle Lines Throughout Car and Tie Up excess Firebottle Wiring Under Center Console		



<b>Step 13</b>	<b>Battery Adaptor Plate Installation (Optional)</b>		15
<b>Note</b>	The Battery Model has Changed from BTL35A480C to BTL24A480CW. The New Battery is Wider and Longer, so the Battery Box Will Need to Be Modified If you Replace Your Battery and Receive the new Model. New Battery is not included with the Conversion Kit.		

1	Hammer The Inside Flange of the Battery Box Flat, or Grind/Cut the Flange off.	
		
2	Place Battery Adaptor Plate Over Outside Flange as Shown to Create Enlarged Battery Box.	
		

<b>Step 14.0</b>	<b>Update Differential and Transmission Cooler Mounting Hardware</b>		30
1	Remove One of the M4 Nuts and Bolts Securing the Differential and Transmission Cooler Housing		
2	Drill Out the Hole to 1/4"		
3	Replace Hardware with Provided M6x20 Flange Bolt, 1/4" Fender Washer and M6 Flange Lock Nut		
4	Repeat for Remaining Five Fasteners		

<b>Step 15.0</b>	<b>Update Differential Cooler Lines with New Lines and New Routing.</b>		60
Note:	The old lines (black) ran from the differential to the filter, then to the pump, then to the cooler, then back to the differential. The new lines (grey) are routed to put the pump after the cooler to reduce the temperature of the fluid running through the pumps.		
1	Remove Old Differential Cooler Lines and Filter. Clean Filter for Re-Use with New Lines		
2	Install New Differential Cooler Lines and Filter:		

	LRR-037 from Lower Differential Outlet Fitting Over Subframe to Filter-In	
	LRR-038 from Filter-Out to RR Cooler Port	
	LRR-039 120deg Fitting on RF Cooler Port to Pump Inlet	
	LRR-040 90deg Fitting on Pump Outlet to Top Differential Inlet	
3	Install Zip Tie Saddle on the Tub on the Right Side of the Diff/Trans Cooler Between Cooler Line Fittings to Secure the Differential Fluid Filter. Use Loctite AA 330 / SF 7387 two Part Adhesive, or similar.	
4	Secure Differential Fluid Filter to Zip Tie Saddle	

<b>Step 16.0</b>	<b>Update Transmission Cooler Lines with New Lines and New Routing.</b>	75
Note:	The old lines (black) ran from the transmission to the filter, then to the pump, then to the cooler, then back to the transmission. The new (grey) lines are routed to put the pump after the cooler to reduce the temperature of the fluid running through the pumps.	
1	Remove Old Transmission Cooler Lines, and Filter. Clean Filter to Re-use with New Lines.	
2	Remove Transmission Fluid Pump, Rotate 180 Degrees so Fittings are on the Left Side of the Car and Re-Install. Rotate Fittings According to the Image Below	

	3	Install New Transmission Cooler Lines and Filter:	
		LRR-033 from Lower Transmission Outlet Fitting to Filter-In	
		LRR-034 from Filter-Out to LR Cooler Port	
		LRR-035 from LF Cooler port to the Transmission Pump Inlet	
		LRR-036 from Pump Outlet to Upper Transmission Inlet Fitting	
		Secure the New Lines and Filter to the Power Plant Frame in a Similar Manner to the Old Lines.	
	4	Secure All Cooler Lines and Wires	

<b>Step 17.0</b>	<b>Final Wrap up / QC</b>		10
	3	At this Point All Conversion Components have been Completed.	
	2	Ensure Each Step Above has been Completed, all Wires have been Secured, all Fasteners Properly Torqued and all Fluids have been Refilled.	
	3	Reconnect Battery Quick Connect	
	4	Turn Power on and Start Car. Run for 1 Minute Monitoring for Leaks or Noises.	
	5	Shut Engine Off and Inspect for Leaks, Interferences, etc.	

<b>Step 18.0</b>	<b>Update AiM MXL2 Dash</b>		30
	6	The ECU Driver for the Bosch MS6 Cup ECU is available in the current Race Studio 3 Software. It's called: "Bosch ND2" under the Mazda Manufacturer. You may update or build your own configuration using this driver, but note that all channel names are different, so each alarm will need to be reviewed and edited to ensure they are functioning correctly.	
	7	A new baseline configuration with updated alarms is available for download here: <a href="http://longroadracing.com/home/global-mx5-cup/gmx5-documentation/">http://longroadracing.com/home/global-mx5-cup/gmx5-documentation/</a>	
	8	Install the Updated Configuration and Confirm that RPM, Water Temp, Lambda and other Items are being displayed correctly. A thorough review of all live measures in the Race Studio Software is recommended to ensure all Systems are working.	

Your 2019 Global MX-5 Cup Conversion is Now Complete!



**2019 Global MX-5 Cup ND2 Conversion Kit Parts list Appendix**

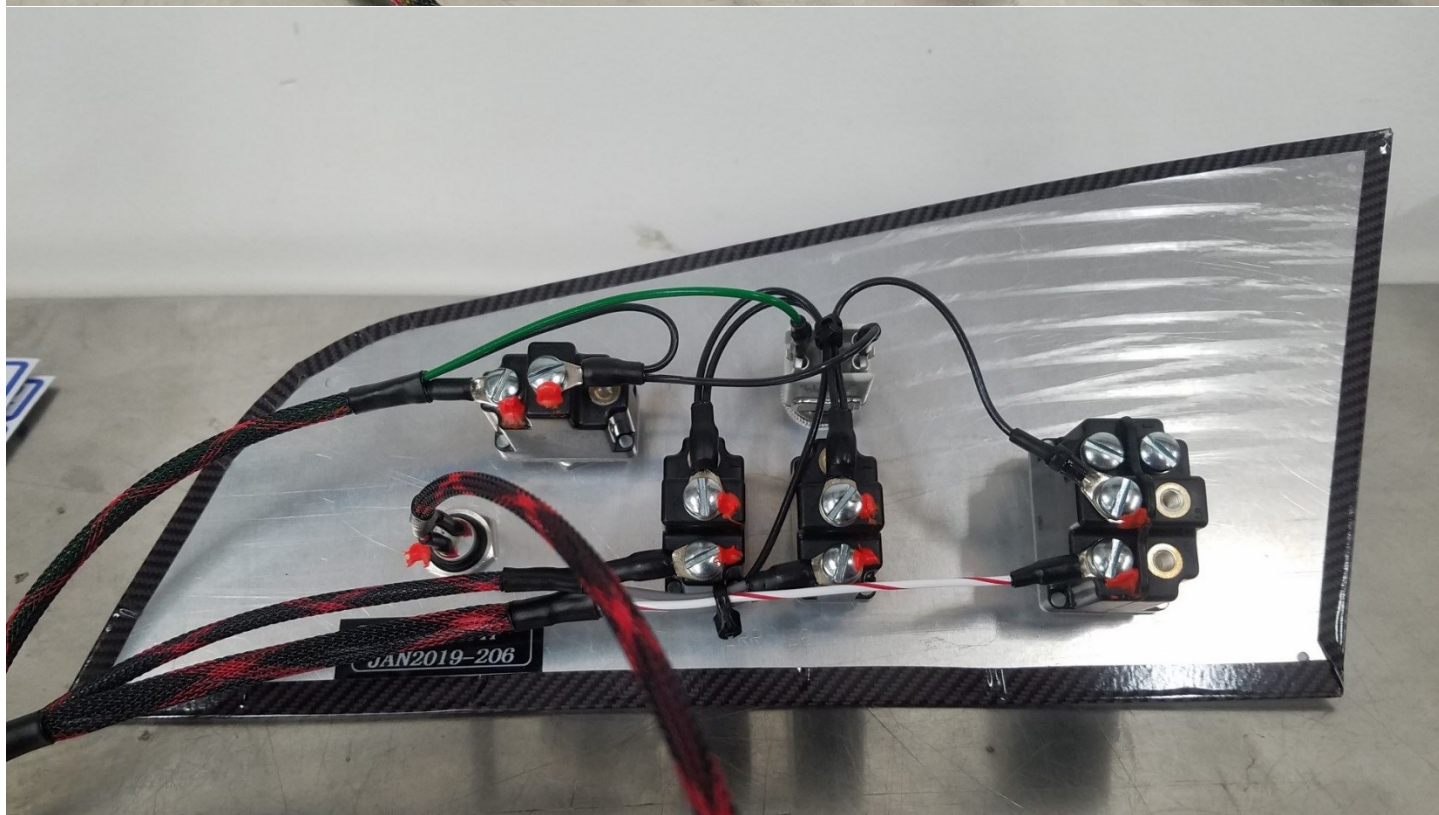
Install Step	Check List	System	Component	Mazda part #	Qty	Subcomponents	Qty
3		Electrical	FRONT Harness	ND6N-67-010B	1	n/a	n/a
2		Engine	Oil Filter Gasket (2018 spec)	PEES-14-342	1	n/a	n/a
6		Engine	Engine, Sealed	TBD	1	n/a	n/a
11		Safety	ND2 Fire Bottle Bracket with Clamps	0000-08-D201	1	ND2 Fire Bottle Bracket, LRR 190	1
						1.3125-1.75 hose clamps	3
11		Safety	10mmx52" Long Fire Bottle Line	0000-08-D235-52	1	n/a	n/a
12		Electrical	ND2 Battery Tray Adaptor	0000-08-D202	1	n/a	n/a
10		Electrical	ND2 ECU Adaptor Harness	0000-08-D203	1	n/a	n/a
10		Electrical	ND2 ECU Adaptor Mount Assembly	0000-08-D204	1	ND2 ECU Adaptor Mount A, LRR 196	1
						ND2 ECU Adaptor Mount B, LRR 197	1
						M6 Flange Nut (welded)	2
						M6x12 Ser Flange Bolt	2
11		Electrical	ND2 Cage Ground Stud, M8x20	0000-08-D205	1	n/a	n/a
11		Electrical	ND2 Cage Ground Nut M8	0000-08-D206	1	n/a	n/a
11		Electrical	Block out Panel Grommet 1-1/2"	0000-08-D207	1	n/a	n/a
7		Body	ND2 Grill	0000-08-D208	1	n/a	n/a
7		Body	ND2 Radiator Screen	0000-08-D231	1	n/a	n/a
13		Differential / Transmission Cooler	ND2 Diff/Trans Cooler Mounting Hardware and Foam	0000-08-D209	1	M6x20 Flange Bolt	6
						1/4" Fender Washer	6
						M6x1 Flange Lock Nut	6
						1/4"x1/2" Buna Foam	26"
15		Transmission Cooler Lines	ND2 Trans-Housing to Filter	0000-08-D210	1	n/a	n/a
			ND2 Trans-Filter to Cooler	0000-08-D211	1	n/a	n/a
			ND2 Trans-Cooler to Pump	0000-08-D212	1	n/a	n/a
			ND2 Trans-Pump to Housing	0000-08-D213	1	n/a	n/a
14		Differential Cooler Lines	ND2 Diff-Housing to Filter	0000-08-D214	1	n/a	n/a
			ND2 Diff-Filter to Cooler	0000-08-D215	1	n/a	n/a
			ND2 Diff-Cooler to Pump	0000-08-D216	1	n/a	n/a
			ND2 Diff-Pump to Housing	0000-08-D217	1	n/a	n/a
11		Electrical	ND2 Battery Capture	0000-08-D219	1	n/a	n/a
11			Battery Capture Wing Nuts	0000-08-D220	2	n/a	n/a
5		Cooling	ND2 Radiator	0000-08-D221	1	n/a	n/a
5			ND2 Radiator Duct Left	0000-01-5662LT	1	n/a	n/a
5			ND2 Radiator Duct Right	0000-01-5662RT	1	n/a	n/a
5		Engine Oil Cooler	ND2 Oil Cooler, SET 925	0000-08-D222	1	n/a	n/a
5			ND2 Oil Cooler Line Short	0000-08-D223	1	n/a	n/a
5			ND2 Oil Cooler Line Long	0000-08-D224	1	n/a	n/a
5		Engine Oil Cooler	ND2 Oil Cooler Bracket Kit	0000-08-D225	1	Engine Oil Cooler Bracket, LRR 203	2
						M6 Flange Lock Nut	2
						M6x16 Flange Bolt	2
						1/8" Rivet	4
						Zip Tie	2
						1/4"x1/2" Buna Foam	48"
						3/8" ID Clear Vinyl Tube	2"
9		Electrical	ND2 O2 Sensor Bosch LSU 4.9	0000-08-D226	1	n/a	n/a
10		Electrical	ND2 ECU Bosch MS6 Cup	0000-08-D227	1	n/a	n/a
10		Electrical	ND2 ECU Mount Assembly with Dual Lock	0000-08-D228	1	ND2 ECU Mount (LRR 193)	1
						ND2 ECU Mount Cover (LRR 194)	1
						ND2 ECU Mount Capture (LRR 195)	1
						M6 Flange Nut (4 weld, 3 package)	7
						M6x12 Ser Flange Bolt	4
						Dual Lock	16"
11		Electrical	Unassembled Harness Update Kit	0000-08-D229	1	Main Battery Cable	1
						Battery Cable Positive (Master Solenoid to Main Breaker)	1
						Battery Cables (pos & neg w/quick connect)	1
						Chassis Ground/pos cable to breaker w/quick connect	1
						Fuel Reset, Fuel Map Switches	1
						Fuel Reset, Fuel Map Octane Sticker Labels	1
						18ga Ground Wire from Power Panel, 5/16" ring/DTM Pin, 19"	1
						10ga Ground Wire Extension, 5/16" ring/Butt Connector and Heat Shrink, 7"	1
						Power Panel LRR 192, w/Circuit Breaker, and Fuse Block w/7" 8ga wire with 5/16" Ring Terminal	1
						1/8" Rivet for DTM Connector Mount	1
						M6x16 Flange Bolt	1
						M6x1 Flange Lock Nut	1
						Power Wire Insulator Cover	6

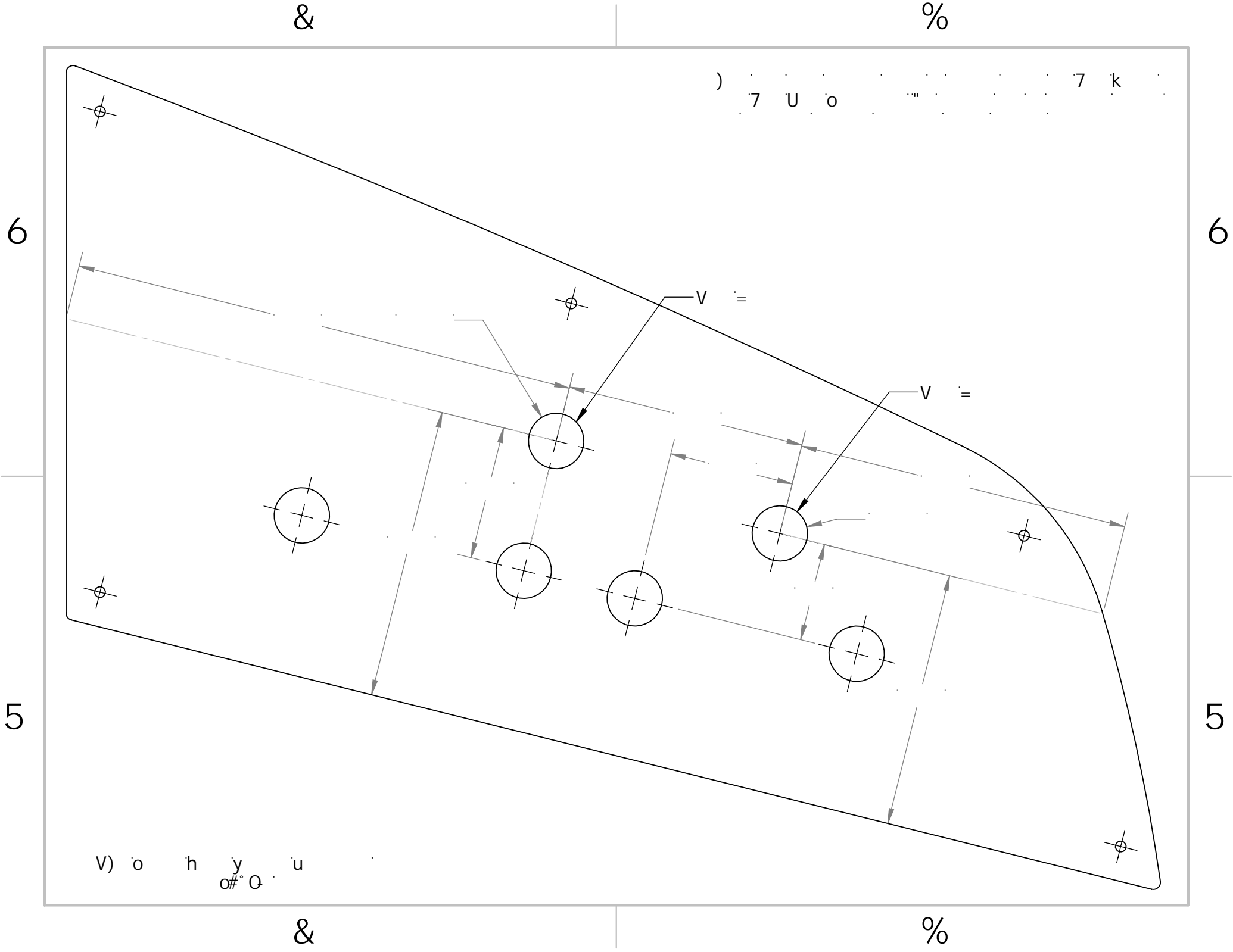
**Parts Required only for Cars with Last 6 Digits of Vin # <200001**

10		Electrical	Body Control Module	D23N-67-560A	1	n/a	n/a
10		Electrical	2019 Instrument Harness	ND6N-67-030A	1	n/a	n/a

**OPTIONAL**

11		Electrical	Assembled Harness Update Kit	0000-08-D232	1	n/a	n/a
		Electrical	ND2 Pit Lane Speed limiter	0000-08-D233	1	n/a	n/a



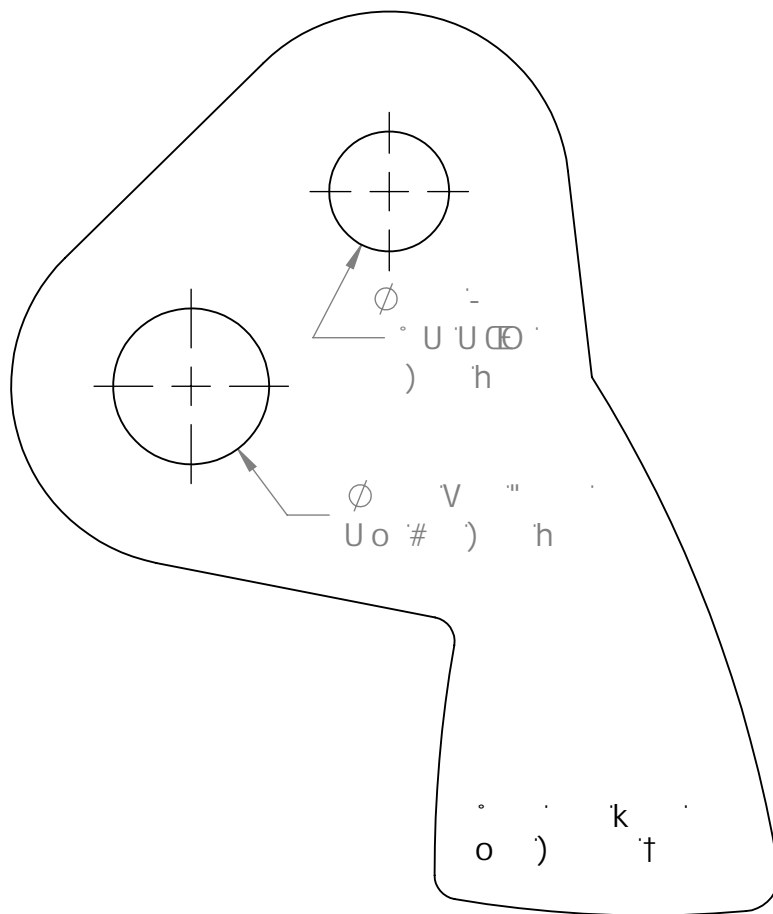


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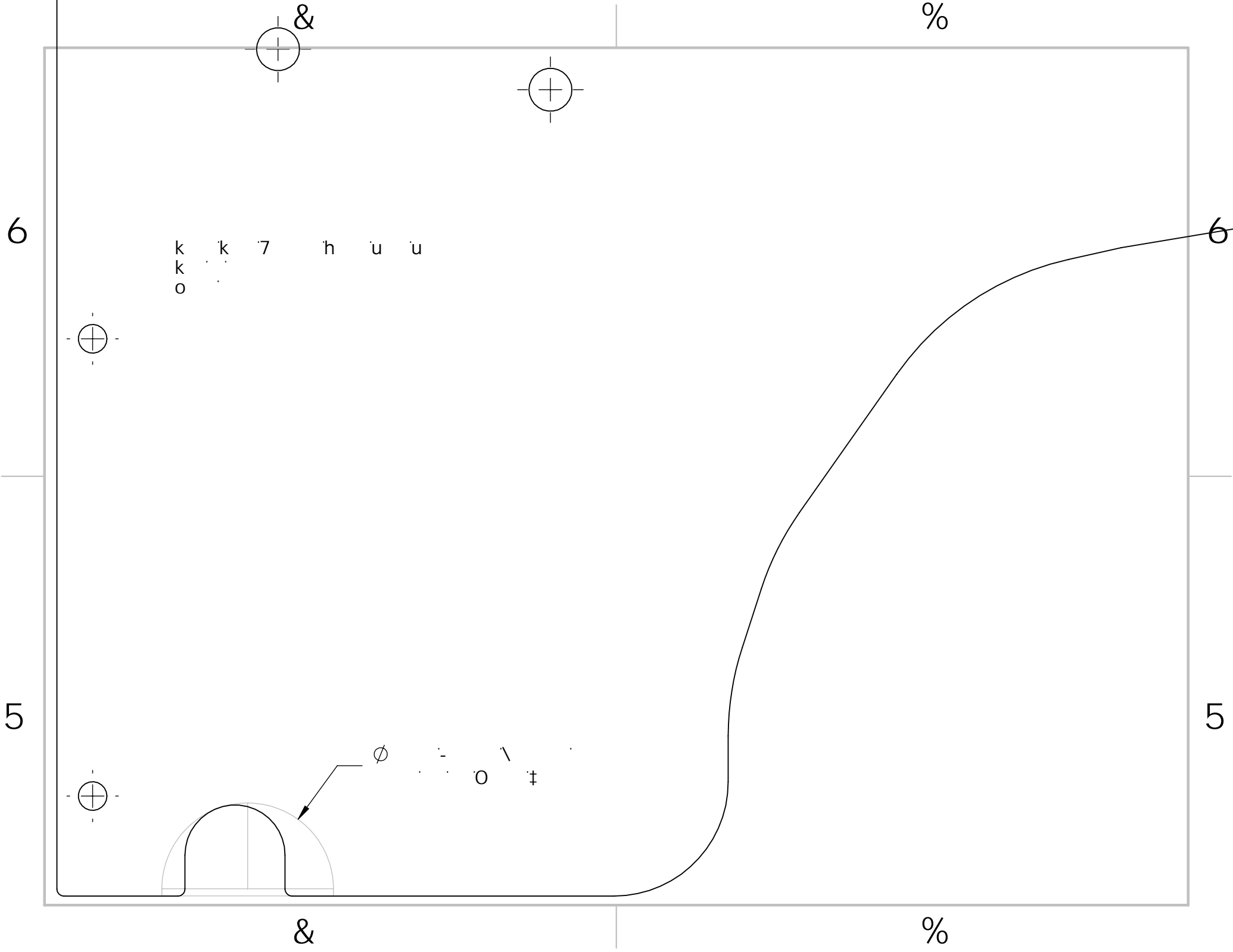
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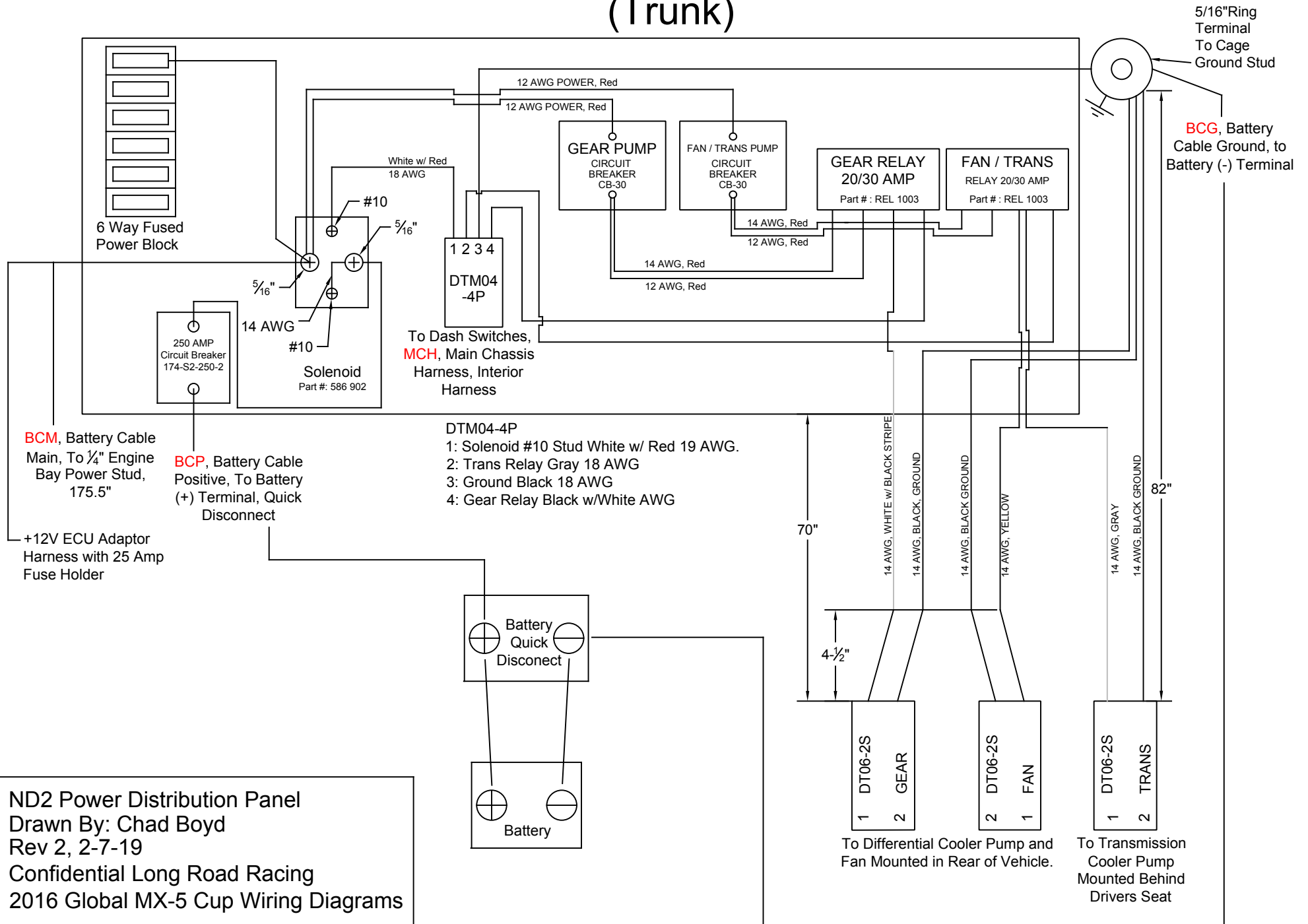
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# ND2 Power Distribution Panel (Trunk)



ND2 Power Distribution Panel  
Drawn By: Chad Boyd  
Rev 2, 2-7-19  
Confidential Long Road Racing  
2016 Global MX-5 Cup Wiring Diagrams