

# Mk III Owners Manual Third Edition

## *Summary of Changes through May 31, 2010*

### **6/23/2009**

Front cover: Add car photo to cover

Page 76: Figure 53 title rolled to top of page 77. Move back to bottom of page 76.

### **7/29/2009**

**Correct car number range for wiring diagrams from “1401 to 1899” to “1041 to 1899”**

Page xii: Change 1401 to 1041 in

Wiring Diagrams 1041 to 1899..... 143

Page xviii: Change 1401 to 1041 in:

1041 Change wiring diagram..... 130, 131, 143, 169

Page 143: Change 1401 to 1041 in title and first paragraph.

Page 197: Change 1401 to 1041 in:

Wiring Diagrams 1041 to 1899..... 143

### **11/12/2009**

New high art covers from Superformance LLC

Page 172: Corrupted figure replaced

### **2/19/2010**

**Add ZF differential**

Page xiv: Table of Contents.

Page xvii: List of Figures

Page xviii: List of Engineering Changes

Page 11: Differential

Page 76: Differential fluid

Page 192: Index

Page 198: Appendix

Pages 199-120: Appendix A: ZF IRS Differential

Pages 201-204: Renumbered notes pages

**5/19/2010**

Add the Superformance logo to the cover.

**5/25/2010**

Custom front cover with name: Omit date

Front cover in document: Change date to June 2010

Pages 93-98: Changes to wheels section to better explain the rear wheel spacer.

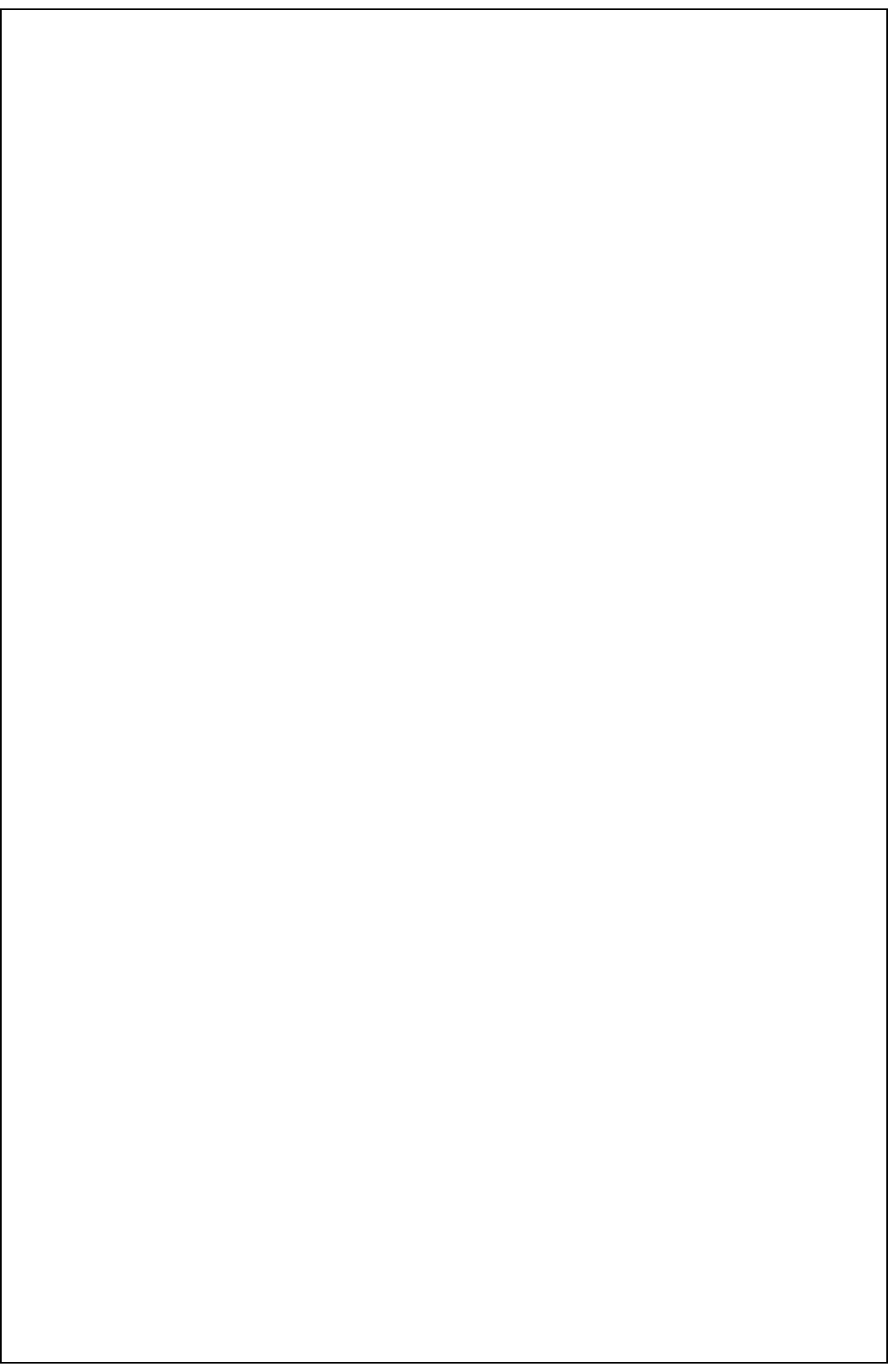
Pages 139-140: Swap the + and - battery terminals in Drawing 6 of 8.

®



# **Superformance Mk III Owner's Manual**

**Third Edition**  
June 2010



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# LIST OF ENGINEERING CHANGES

The following list includes only engineering changes referenced in this manual. Car numbers are approximate as described in *Identifying Engineering Changes*, page 16.

<u>Car</u>	<u>Brief Description of EC</u>	<u>Refer to Page</u>
150	Change from steel to Trigo wheels .....	11
150	Change ball joints .....	78
300	Change seat structure .....	16
680	Change from Ford to Wilwood brakes.....	13
800	Change from Trigo to WAW1 wheels .....	11, 89
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980	Change from AVO to Bilstein shocks.....	14, 84
1041	Change wiring diagram.....	130, 131, 143, 169
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from 3.08 to 5.13 are available from Ford Racing Performance Parts. A number of owners have re-gearred their differential.

Beginning with *approximately* chassis number 2068, the Mk III began using the same BTR Automotive IRS differential used in the current Australian built Pontiac GTO. The BTR uses Dana gears with a 3.46 rear end ratio. The Mk III uses a cone type limited slip differential. The Superformance Coupe uses the same BTR differential, but with a sealed Hydratrac limited slip. Optional ratios are not available.

For identification purposes, the BTR Automotive differential has eight ribs running front to back on the bottom with “BTR Automotive” between the ribs toward the snout. The Ford differential has only a few circumferential ribs.

For the ZF differential, see Appendix A, page 199.

## **Wheels**

Early cars from car number 032 to *approximately* 150 had as standard 15” stamped steel wheels with a Halibrand look-alike fiberglass wheel cover held in place by the knock-off spinner. Trigo 15” wheels were optional.

Beginning with *approximately* car number 150, the 15” Trigo wheels became standard. A number of dealers and owners installed 17” wheels from PS Engineering.

Beginning with *approximately* car number 800, Superformance began using 15” wheels from Wheelcraft Alloy Wheels (WAW) in South Africa and shortly thereafter offered the WAW optional 17” wheels. These early WAW wheels are referred to in this manual as WAW1.

Beginning with *approximately* car number 1200, the design of the WAW sourced wheels changed. These later WAW wheels are referred to in this manual as WAW2.

The Trigo, PS Engineering, WAW1, and WAW2 wheels are all cast aluminum Halibrand look-alike true knock-offs with 5-pin drive and three ear spinners. However, there are detailed differences that affect interchangeability. Interchanging these wheels without accommodating these differences can result in a dangerous situation.

See the *Wheels and Tires* section in *Maintenance*, page 89, for full a full description of the wheels and details on interchangeability before attempting to interchange wheels.

**Standard 15” Wheels**

Front Wheels.....	15" x 7.5" (8J)
Rear Wheels.....	15" x 9.5" (10J)

**Optional 17” Wheels**

Front Wheels.....	17" x 9.5"
Rear Wheels.....	17" x 11.5"

**Tires**

**Recommended 15” Tire Sizes**

<u>Tire</u>	<u>Size</u>
Front.....	255/60-15
Rear.....	275/60-15
Optional rear .....	295/50-15

**Recommended 17” Tire Sizes**

<u>Tire</u>	<u>Size</u>
Front.....	275/40-17
Rear.....	335/35-17
Optional rear .....	315/35-17

**NOTE:** The speedometer is geared for the 275/60-15 rear tire. Use of another size rear tire may require a change in the speedometer gears. The speedometer gear can be changed from below without removing the transmission.

marks on the dip stick. Top up with the recommended oil if required.

The oil level should be checked at operating temperature, immediately after stopping the vehicle while parked on level ground. The dip stick must be securely replaced to avoid oil leakage.

Check the oil every fuel fill up. High performance engines can use as much as a quart of oil every 500 miles by design.

### **Filling Engine Oil**

Park the car on level ground and turn off the engine. The engine oil filler cap is typically located on top of the left hand side engine tappet cover. To remove, simply pull upward.

### **Oil Usage Notes**

- 1) Running the car with an oil level above the maximum may cause oil wastage.
- 2) Running the car with an oil level below the minimum could cause considerable damage to the engine.
- 3) The engine oil should be changed before and after every track event.
- 4) For track event usage the oil should be topped up to the maximum mark. Monitor the oil level throughout the day and top off as needed.
- 5) Use a high quality, high flow oil filter and change with every oil change.

### **Transmission Fluid**

The transmission fluid specifications depend on the transmission installed. Your transmission provider should provide the oil change specifications.

Fluid capacity: \_\_\_\_\_ quarts

Fluid type: \_\_\_\_\_

Fluid change interval

Break in: \_\_\_\_\_ miles

Routine: \_\_\_\_\_ miles

Typical intervals for Tremec transmissions are 15,000 miles for break in and every 30,000 miles thereafter for routine driving.

The Tremec 3550 and TKO 5-speed transmissions require 2.75 quarts of transmission fluid such as GM Synchronesh II or equivalent.

### Differential Fluid

Rear axle fluid normally does not require replacement in absence of repairs. See *Differential*, page 10, to identify differential type.

**Ford 8.8 Differential:** For the early cast iron 8.8 differential, Ford recommends 85w90 gear lube. For the later aluminum 8.8 differential, 75w140 synthetic is the proper lube recommended by Ford. For either, add 2.5 quarts of gear oil and one bottle (4 oz) of Ford Motorsports M19546-A friction modifier.

**BTR Automotive Differential:** The required fluid is 1.64 quarts of GM # 89021809, special for this unit. It also requires 1 ounce of GM additive # 89021958, again specific for this unit.

**ZF Differential:** See page 200.

### Brake Fluid – Adding, Bleeding, and Replacing

The brake fluid reservoir is mounted directly on the brake master cylinder. Due to the location of the brake master cylinder under the driver side fender, a funnel with flexible hose is required to add fluid (Figure 53). A large syringe and tubing can also be used. Be careful when removing the cap and gasket. They are easy to drop and hard to find.



[Figure 53 – Filling Brake Master Cylinder]

To bleed the brakes or replace the brake fluid, use a Mityvac®, Motive® or equivalent vacuum pump and follow the instructions provided with the pump. Remove the wheels first. There is a bleed valve on each brake caliper.

**NOTE:** Any DOT 3 or DOT 4 or DOT 5.1 fluid can be used. **DO NOT** use DOT 5. See *Brake Fluid Ratings* page 120.

**CAUTION:** Brake fluid is corrosive to paint. Use care not to spill fluid on the finish. Any spills should be immediately flushed away with fresh water. Do not overfill as it may cause fluid to leak out.

**BRAKE FLUID WARNING BUZZER:** A low brake fluid level will cause a warning buzzer, behind the dashboard, to sound when switching on the ignition.

#### **Clutch Fluid – Adding, Bleeding, and Replacing**

The clutch fluid is located in the remote reservoir on the firewall (Figure 54).



[Figure 54 – Clutch Master Cylinder]

To bleed the clutch or replace the clutch fluid, use a Mityvac®, Motive® or equivalent vacuum pump and follow the instructions provided with the pump. The bleed valve is on the clutch slave cylinder. Check the fluid level often and be careful not to suck all the fluid out of the clutch master cylinder as clearing the air is a difficult task.

**NOTE:** Any DOT 3 or DOT 4 or DOT 5.1 fluid can be used. **DO NOT** use DOT 5. See *Brake Fluid Ratings* page 120.

**NOTE:** The clutch slave cylinder seals have a tendency to fail after several years. Consider replacing the slave cylinder every five years as preventative maintenance. If the fluid is black when bled, change the slave cylinder now.

**CAUTION:** Brake fluid is corrosive to paint. Use care not to spill fluid on the finish. Any spills should be immediately flushed away with fresh water. Do not overfill as it may cause fluid to leak out.

### **Engine Coolant**

The engine coolant is a 50/50 mixture of anti-freeze and water. The coolant should be filled at the header tank which is mounted on the front of the engine above the water pump.

### **Spark Plugs and Change Interval**

The type of spark plugs depends on the engine you have selected. Your engine provider should provide the spark plug specifications.

Plug type: \_\_\_\_\_

Plug change interval: Every \_\_\_\_\_ miles.

A reasonable spark plug replacement interval is every 12,000 for conventional spark plugs and every 50,000 miles for platinum and iridium spark plugs. Platinum and iridium plugs can last longer than 50,000 miles, but the risk of seizure in an aluminum head increases if they are left in longer.

**NOTE:** When installing spark plugs in aluminum heads, coat the threads sparingly with anti-seize compound.

### **Ball Joints**

On cars from 32 to *approximately* 150, the ball joints were sealed and could not be lubricated. Later cars have screw in joints which can be lubricated. It is recommended that the cars with sealed ball



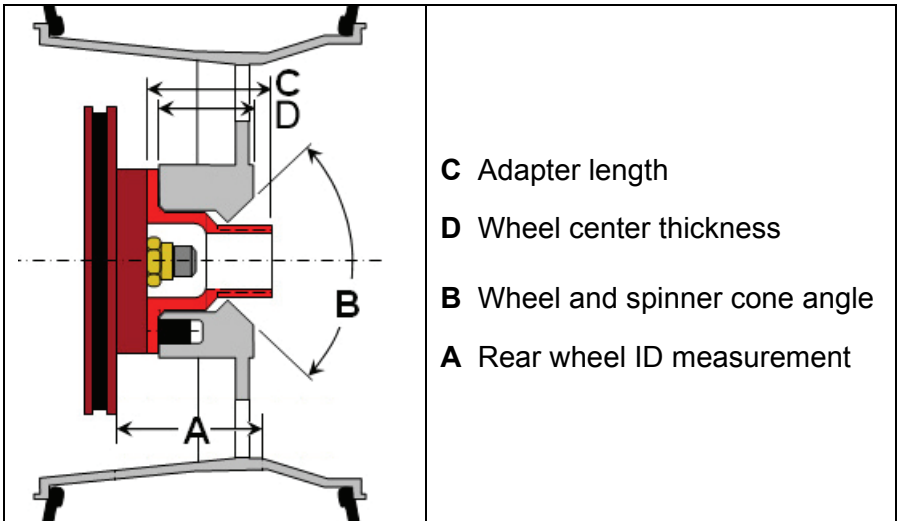
## Primary Differences

The primary differences that affect interchangeability are shown below. Differences from the current WAW2 wheels are shown in **bold**. Dimensions given are approximate and may vary somewhat.

Wheel	Trigo	WAW1	WAW2
1/2" rear spacer	<b>Yes (1)</b>	No	No
Rear lug stud length	<b>Plus 0.5"</b>	Std	Std
Front adapter length	4"	4"	4"
Rear adapter length	4"	<b>4.5"</b>	4"
Front wheel center thickness	2.7"	2.7"	2.7"
Rear wheel center thickness	2.7"	<b>3.2"</b>	2.7"
Rear wheel ID measurement	<b>5.0" (2)</b>	<b>5.25"</b>	4.75"
Spinner cone angle	60°	60°	60°
Wheel cone angle	60°	60°	60°
Spinner contact width	<b>1/4"</b>	1/2"	1/2"
Spinner step	No	<b>Yes</b>	No
Drive pin diameter	<b>0.745"</b>	0.765"	0.765"
Drive pin hole diameter	0.775"	0.775"	0.775"

Note (1): Some dealers and owners have removed the rear spacer.

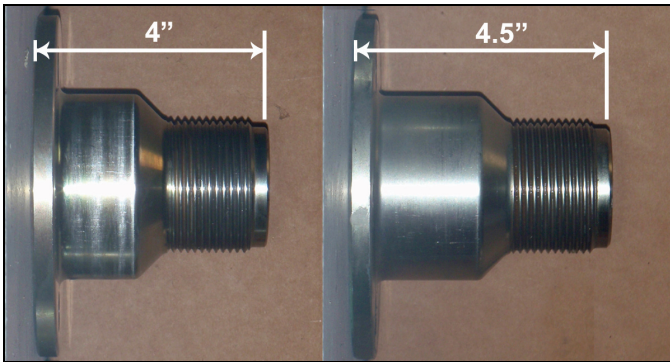
Note (2): 4.5" when the rear spacer has been removed.



[Figure 64 – Wheel Dimensions]

**Rear Spacer and Rear Lug Stud:** The stamped steel and Trigo rear wheels use a 1/2" aluminum spacer between the hub and the adapter to provide clearance for the rear brake caliper. The rear wheel lug studs are 1/2" longer to accommodate the spacer. WAW wheels do not have the spacer. The WAW1 wheels use a 1/2" longer rear adapter. The WAW2 wheels use a modified rear wheel hub design. Please see *Additional Information*, page iv.

**Front Adapter Length and Wheel Center Thickness:** All Trigo and WAW wheels have a 4" long adapter and a 2.7" thick wheel center thickness except the WAW1 **rear** wheels which have a 4.5" long adapter and a corresponding 3.2" wheel center thickness.



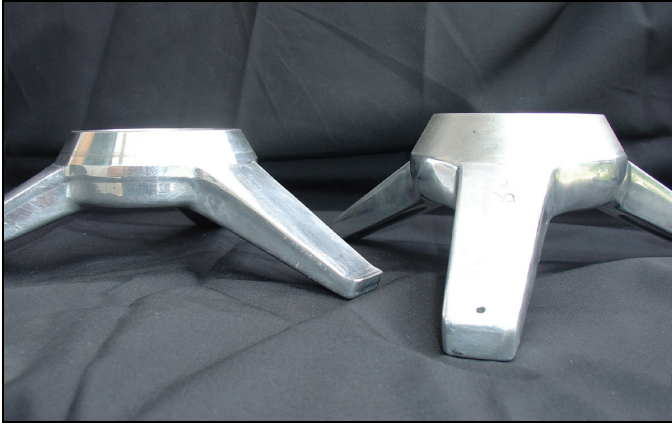
[Figure 65 – 4" Adapter and 4.5" Adapter]

**Spinner Cone Angle:** The spinner cone angle is 60° for both the Trigo and WAW wheels. For some of the early WAW1 spinners the cone angle was slightly greater than 60°. This was an anomaly and was subsequently changed to 60°.

**Spinner Contact Width:** The WAW spinners have a deeper cone face than the Trigo spinners and a corresponding larger contact area with the wheel as shown in Figure 66. The width of the contact area is 1/4" for the Trigo wheels and 1/2" for the WAW wheels. This difference does not affect the function of the spinner.

**Spinner Step:** The WAW1 spinners have a step between the cone and the ears as shown in Figure 67. This step does NOT exist on the Trigo or WAW2 spinners as shown in Figure 66. This step can bottom out on Trigo and WAW2 wheels. Therefore, WAW1

spinners should NOT be used with Trigo or WAW2 wheels. However, Trigo and WAW2 spinners can be used on WAW1 wheels.



[Figure 66 – Trigo (left) and WAW2 (right) Spinners]



[Figure 67 – WAW1 Spinner Showing Step]

**Driver Pin Diameter and Drive Pin Hole Diameter:** The Trigo and WAW wheels have a 0.775” drive pin hole diameter. The Trigo wheels use a 0.745” diameter drive pin. The WAW wheels use a 0.765” diameter drive pin. Trigo wheels may be used with WAW drive pins and WAW drive pins may be used with Trigo wheels.

See the *Drive Pins* section, page 100, for proper drive pin maintenance. WAW2 drive pins vary up to 0.770”, a tight fit which requires particular care.

**Drive Pin Wrench Variations:** Drive pins have either a 1/2” 6-point hex (Allen) drive, a 12 mm 6-point drive, or a 12 mm 12-point drive. The proper drive size and type must be used to avoid damaging the drive pins. A damaged drive pin may make it impossible to re-install the wheel since the fit is tight.



[Figure 68 – 6 Point and 12 Point Drive Pins]

Figure 68 shows from left to right a 6-point hex drive pin, a 12-point drive pin, and a 6-point drive pin with threads extending up into the socket area. The extended thread drive pin may help if the drive pin bottoms on the lug stud.

A 1/2” drive will not fit in a 12 mm socket. A 12 mm drive will fit in a 1/2” socket, but it is loose. Try both a 1/2” and 12 mm drive to make sure that you are using the correct size.

### **Interchangeability**

The Trigo and WAW spinners are interchangeable with the following exception:

- (1) WAW1 spinners should **NOT** be used on Trigo or WAW2 wheels.

The Trigo and WAW wheels are interchangeable with the following exceptions:

- (1) The WAW1 **rear** wheel can only be used with the WAW1 4.5” long adapter. If it is used on the 4” long adapter, 1/2” of threads are covered and the spinner will only contact a few threads, an unacceptable situation.
- (2) The 4.5” long adapter can only be used with the WAW1 **rear** wheel. If another wheel is used with the 4.5” long adapter, the

spinner can bottom out on the adapter before securing the wheel, an unacceptable situation. In addition, the wheel may not fully seat on the adapter, also an unacceptable situation.

- (3) Fitting the Trigo rear wheels to a car without the 1/2" rear spacer may require modifications to the rear wheel and rear lug studs. Fitting the WAW rear wheels to a car with the 1/2" rear spacer may require removal of the spacer and trimming of the rear lug studs. Please see *Additional Information*, page iv.

### **Purchasing Another Set of Wheels**

If you purchase another set of wheels, check all the *Primary Differences* noted above to make sure that your wheels are compatible.

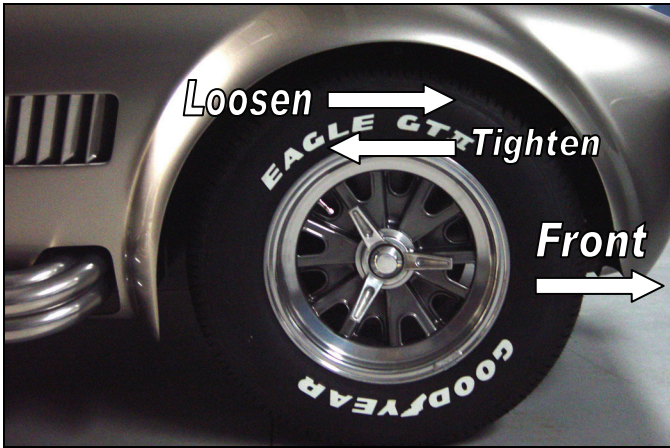
If you have WAW1 wheels, it will be difficult to find aftermarket wheels that fit the WAW1 **rear** adapter. You probably will have to replace the 4.5" WAW1 **rear** adapter with a 4" adapter and replace the WAW1 spinners with WAW2 spinners. If you wish to continue using the original wheels along with the new wheels, you will need to replace the WAW1 rear wheel with a WAW2 rear wheel, or change the rear adapter every time you change wheels. You can continue to use the WAW1 front wheel and adapter.

If you have more than one set of wheels and change them frequently, it is recommended that you have the same rear wheel adapter for both. Changing the adapters frequently is tedious and increases the chance of damaging a drive pin in which case mounting the wheel can be difficult or impossible.

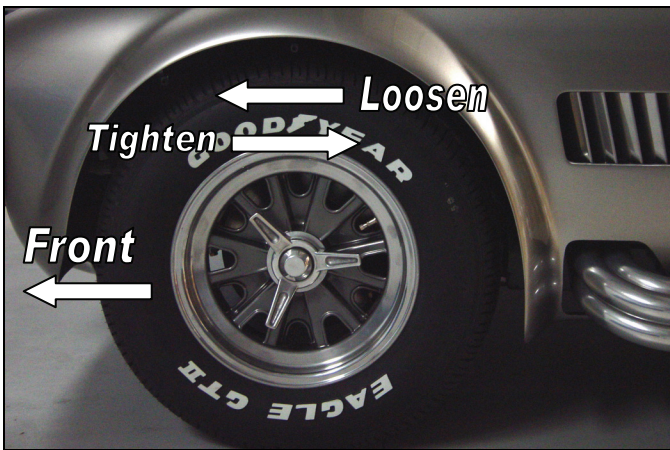
When changing to different wheels, check each of these items to make sure the wheels are secure.

- (1) The drive pins can bottom out on the lug studs.
- (2) The wheel may not fully seat on the adapter. If the wheel is fully seated, it will "clunk" into place. If the wheel wobbles, it is not fully seated.
- (3) The spinner can bottom out on the adapter.
- (4) The spinner can bottom out on the wheel.
- (5) The wheel may not clear the brake calipers.

## Wheel Removal and Reinstallation



[Figure 69 – Right Side Front And Rear Wheel Spinners]

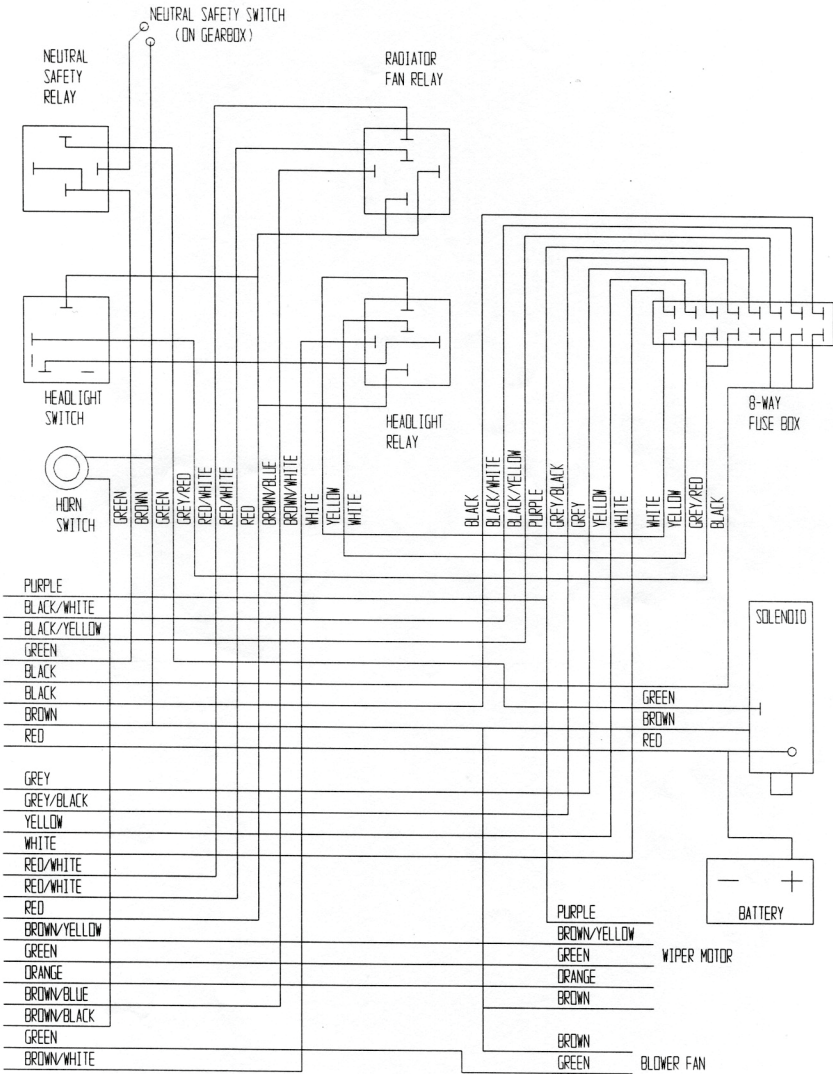


[Figure 70 – The Left Side Front And Rear Wheel Spinners]

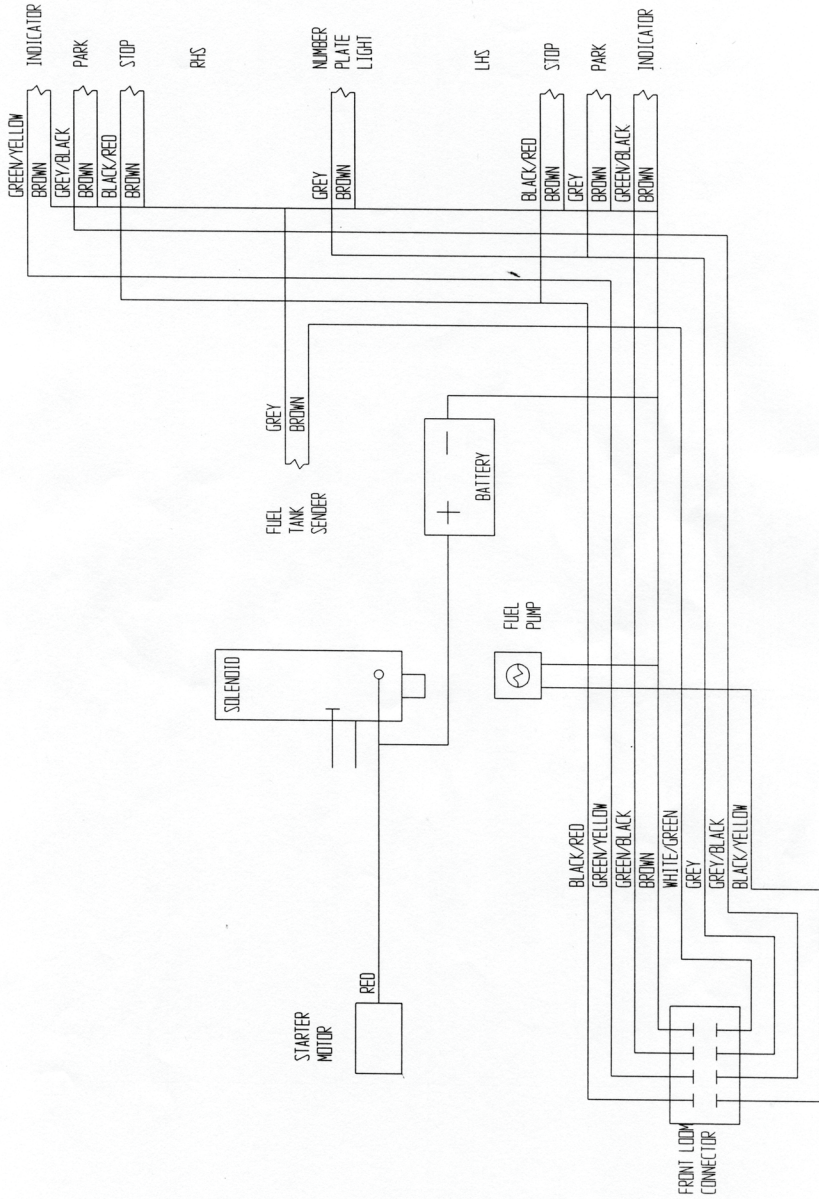
The right side spinners are loosened by turning them clockwise and tightened by turning them counterclockwise (Figure 69). The left side spinners are loosened by turning them counterclockwise and tightened by turning them clockwise (Figure 70).

When a wheel has to be removed, the spinner should be struck with a 6 pound lead hammer in the direction of the wheel rotation

## Drawing 5 of 8 - Dashboard Loom



## Drawing 6 of 8 - Rear Loop





## Wiring Diagrams 1041 to 1899

Beginning with car number 1041, the electric system was redesigned around a Central Electrical Tray.

The Central Electrical Tray is located under the left hand side of the dash. The tray is hinge toward the front of the car and latched toward the rear. Two screws, one screw, or a loop and knob secure the tray. Remove the screw(s) or loop and the tray will swing down to expose the components.

If your car has the Central Electrical Tray and the original version of the dashboard, use the diagrams for car number 1041 to 1899.

If your car has the Central Electrical Tray and the new version of the dashboard, use the diagrams for car number 1900 on.

When removing any electrical component please note and record the wiring positions so that it can be correctly reinstalled.

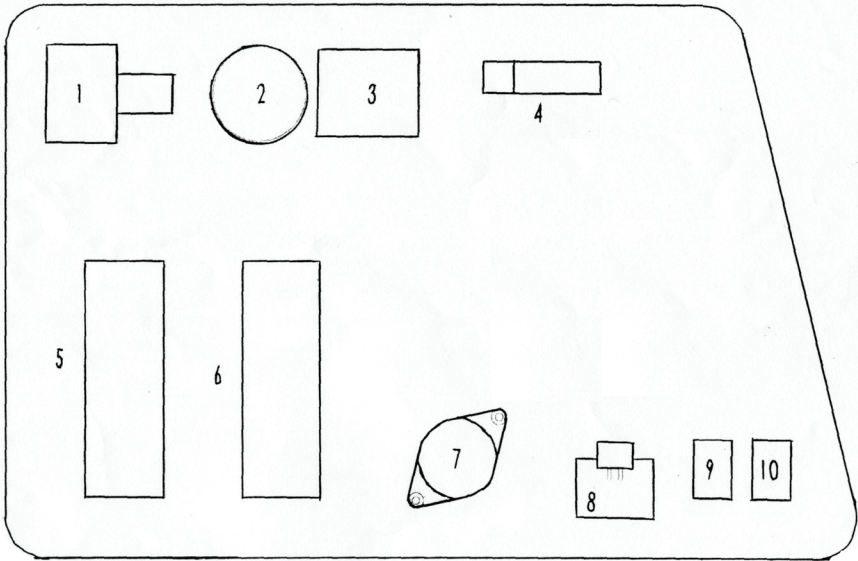
Because of continual running changes, the wiring in your car may vary somewhat from the wiring diagrams presented here.

Detailed color coded wiring diagrams are available separately for each of the three electrical systems. See *Additional Information* page iv.

**NOTE:** Prior to car number 1288, there was one relay for both radiator fans as shown. Starting with car number 1288, there are two radiator fan relays, one for each fan.

**NOTE:** Cars up to car number 1663 use a headlight bulb and a running light in a headlight shell. Cars after 1663 use a sealed beam headlight with the running light in the front indicator light.

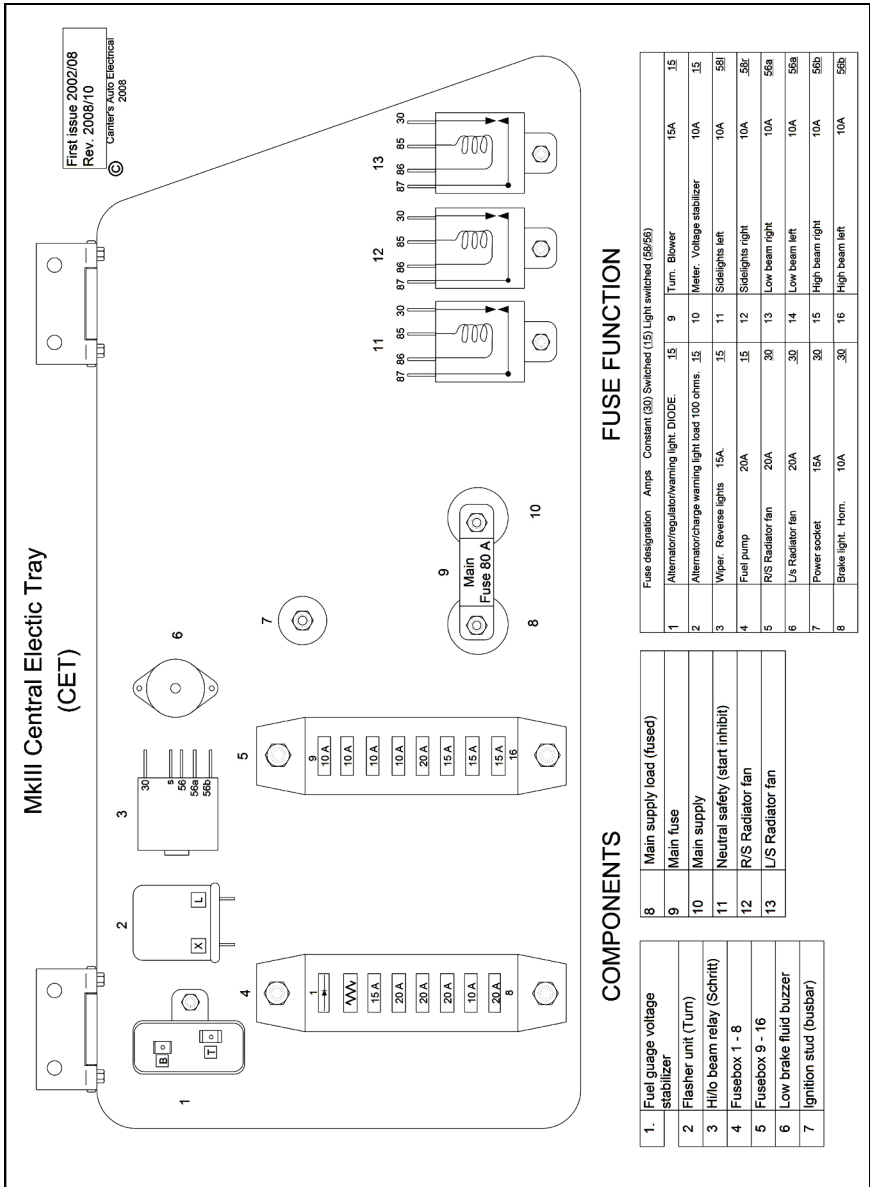
## Central Electrical Tray



### Central Electrical Tray Components

- 1.....Voltage stabilizer
- 2.....Flasher unit
- 3.....Headlight dimmer / dip relay
- 4.....Main fuse
- 5.....No 5 Fuse Box
- 6.....No 6 Fuse Box
- 7.....Brake fluid buzzer
- 8.....Dash dimmer unit
- 9.....Starter inhibit relay
- 10.....Radiator fan relay (see notes, previous page)

# Central Electrical Tray



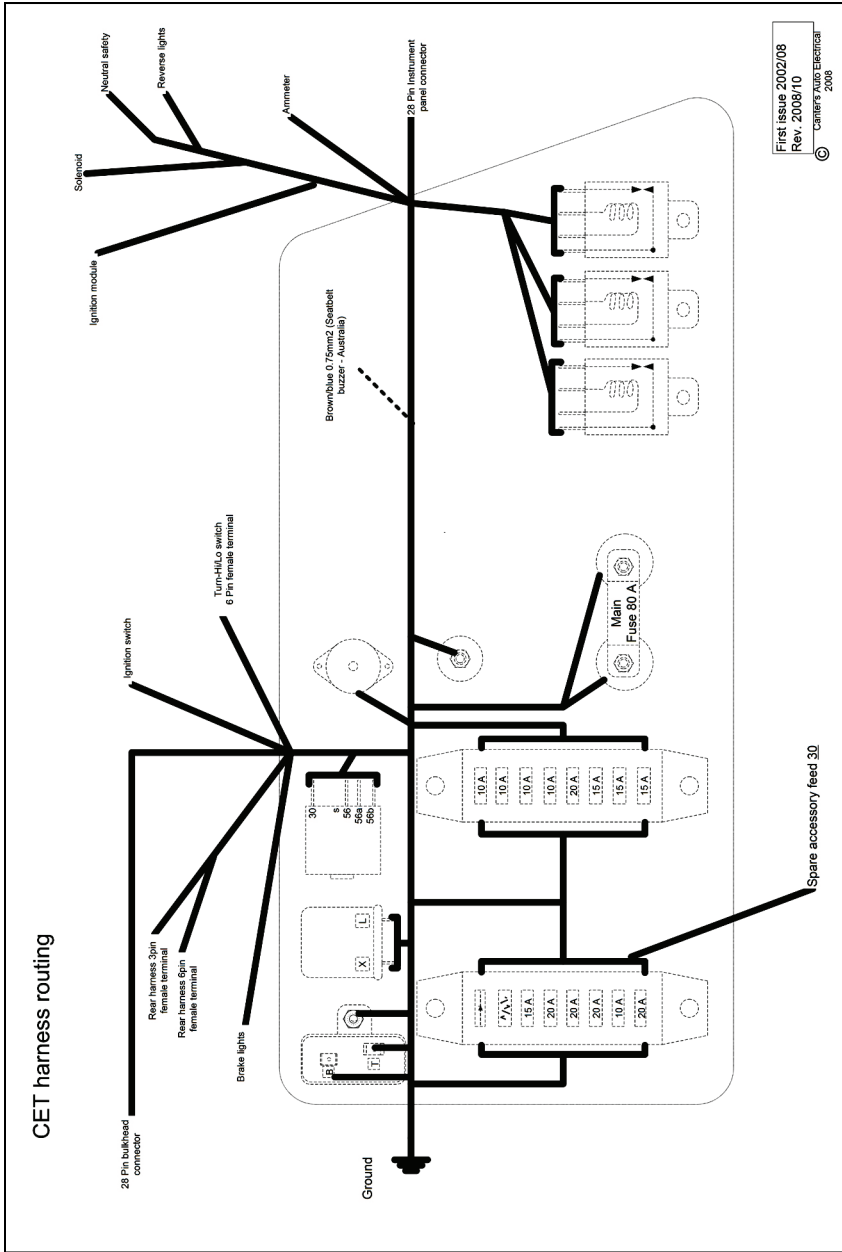
## FUSE FUNCTION

Fuse designation	Amps	Constant (30)	Switched (15)	Light switch(es) (50/50)	
1	Alternator/regulator/warning light, B/D/C/D/E	.15	9	Turn. Blower	
2	Alternator/charge warning light load	100 ohms	.35	10	Meter, Voltage stabilizer
3	Wiper, Reverse lights	15A	.15	11	Sidelights left
4	Fuel Pump	20A	.15	12	Sidelights right
5	R/S Radiator fan	20A	.30	13	Low beam right
6	L/S Radiator fan	20A	.30	14	Low beam left
7	Power socket	15A	.30	15	High beam right
8	Brake light, Horn	10A	.30	16	High beam left

## COMPONENTS

1.	Fuel gauge voltage stabilizer	8	Main supply load (fused)
2.	Fischer unit (Turn)	9	Main fuse
3.	H/l/o beam relay (Schritt)	10	Main supply
4.	Fusebox 1 - 8	11	Neutral safety (start inhibit)
5.	Fusebox 9 - 16	12	R/S Radiator fan
6.	Low brake fluid buzzer	13	L/S Radiator fan
7.	Ignition stud (busbar)		

# Central Electrical Tray Harness Routing



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 Rev. 2008/10  
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# APPENDICES

Significant changes to the Superformance Mk III after the publication date of this manual (June 2009) will be listed in the appendices which follow.

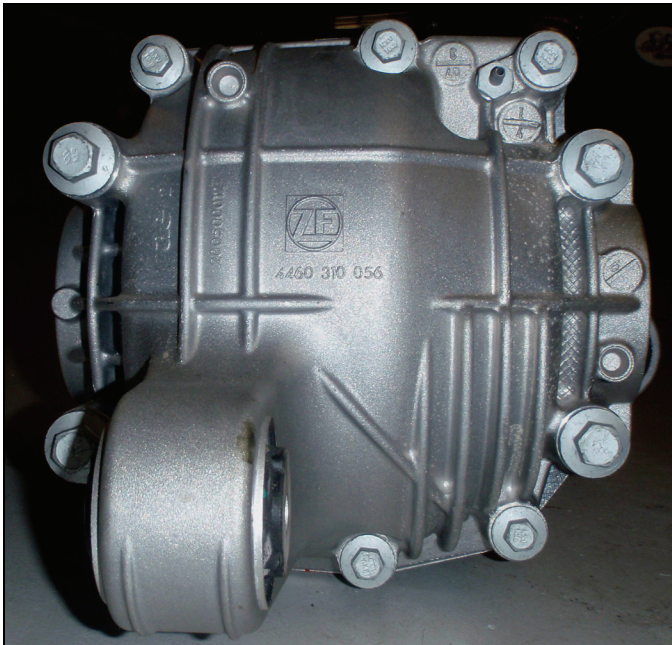


# Appendix A: ZF IRS Differential

February 2010.

In late 2009 around *approximately* car number 2977, Superformance changed the differential in the Mk III and began using the ZF IRS (independent rear suspension) limited slip differential with a 3.45:1 ratio.

The ZF differential is produced by ZF Lemforder in Australia for the GM Holden line of cars, replacing the differential from BTR Automotive. The ZF IRS differential can be identified by the ZF logo cast into the rear of the differential housing.



[Figure A1 – Rear of ZF IRS Differential]

The mounting points on the Ford 8.8 IRS, BTR IRS, and ZF IRS are not the same. Switching from one to the other requires modifications to the Mk III chassis mounting points.

The ZF IRS differential is also used in the 2010 Chevrolet Camaro. The V8 automatic uses a 3.27:1 ratio and the V8 6-speed manual uses a 3.45:1 ratio. Parts and fluids are available from Chevrolet dealers. A third ratio, 2.92, is available from Holden in Australia.

## Fluids

The part numbers are:

<u>Description</u>	<u>Part #</u>
Synthetic Axle Lubricant 75W-90	89021677
Limited Slip Axle Lubricant Additive	1052358

The quantities required are:

<u>Description</u>	<u>Metric</u>	<u>US English</u>
Synthetic Axle Lubricant 75W-90	0.925 liters	0.975 quarts
Limited Slip Axle Lubricant Additive	0.075 liters	0.079 quarts

## Part Numbers

The GM part numbers for the Camaro complete differential and the ring and pinion gear set are:

<u>Description</u>	<u>Ratio</u>	<u>Part #</u>
Complete differential	3.45:1	92239176
Complete differential	3.27:1	92239177
Ring and pinion set	3.45:1	92243259
Ring and pinion set	3.27:1	92243260

The GM part number for the Holden 2.92 ratio is:

<u>Description</u>	<u>Ratio</u>	<u>Part #</u>
Complete differential	2.92:1	92157714

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