



**2017**

**OPEN WHEEL MODIFIED**



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# *Front Suspension*

## I. Front Suspension

### A. Upper Control Arms– Bottom holes front, Top holes rear on chassis

1. Small Screw-in Holder
2. R.S.– 5” Tube Front 6” Tube Rear
3. L.S. Legs– 6” Tube Front 7” Tube Rear
4. Center of Heim to Center of Ball Joint (front),  
Center of Heim to Center of Clevis (rear)

	R.S.	L.S.
Front–	8 1/4”	10 1/2”
Rear–	9”	11”

### B. Lower control arms– Tubular Left 88010, Right 88020

### C. Steering

#### 78-88 GM Metric

- Sweet Steering Box (no quickner)
- Center Link
- Idler Arm

### D. Tie Rods– Howe LH tie rod at center link, 5/8” RH heim at spindle

Stock tie rods may require a shorter tube

1. L.S.-16” Rod @19 3/4” on Center (use to set toe)
2. R.S.-15 1/2” Double Bend Rod @ 19 3/4” on Center

### E. Alignment

1. Camber– right side– 5 degrees / left side– 3 degrees
2. Caster– right side– 6 degrees / left side– 3 degrees
3. Toe 1/4” out
4. Bump Steer-Spacers R.S. 2 1/8” / L.S. 1 1/2”
  - a. Howe idler arm adjusted all the way down
  - b. Howe center link with shims in stock position
  - c. All information is a guideline. You must check bump after finally assembly.

### F. Spindles

1. Pinto
2. Reamed for Screw-in Ball Joints, Top Small / Bottom Large
3. Drill steering Arm to 5/8”

### G. Front Ride Height– with UMP/open e-mod style tires

1. Right- Ground to Bottom of Metric Main Frame - 6 1/8”
2. Left- Ground to Main Frame - 6”

### H. Misc.

1. Use 1” Extended Upper Ball Joint
2. Motor Plate Location
  - a. Top holes (lower in car) no spacers on front mounts
  - b. Lower holes (higher in car) 1” spacers on front mounts

# *4 Link Rear Suspension*

## II. 4 Link Rear Suspension– 60” centered Rear Housing

### A. Lift bar

1. 400# 5” 6th coil or medium rubber biscuit
2. 250# 11” 5th coil– 3/8” preload
3. 5th coil mounted in middle hole
4. 93-5 gas shock
5. support bar– 7” tube, 10” on center
6. 1” spacers between lift bar and rear end plates

### B. Rear End Adjustment (side to side)

1. Left upper torque arm plate to left ride height tab-14”  
depends on LR bite and ride height
2. Panhard bar- j-bar mounted on back side of frame plate
  - a. R.S. of Rear 1 1/2 from the bottom of the slot to the center of the bolt
  - b. Frame –1 spot (below 0) on slot left side of frame
  - c. Center to center 22”

### C. Rear Ride Height– tab to top of birdcage body

1. Over rail rear clip
  - a. Left 10 3/4”
  - b. Right 10 ”

### D. Pinion Angle– 7.5 degrees negative, set lift bar level with frame using the 6th coil

Fine tune with adjuster on top of lift bar

### E. Wehrs Double Sheer Steel Birdcage– Assembly and Location

1. Shock Brackets– R.R. on inside of plates, L.R. on inside of plates
  - a. L.S. Front– 7” if running clamped
  - b. L.S. Rear– 6”
  - c. R.S. Front– 5”
2. Location– Outside edge of rotor to Center of shock brackets
  - a. L.R.– 8 3/4”
  - b. R.R.– 8 3/4”

### F. Brake Brackets– **MUST BE DOUBLE PINNED TO AXLE TUBE!**- install caliper on backside of tube



## *4 Link Rear Suspension-continued*

### H. 4 Link Rods

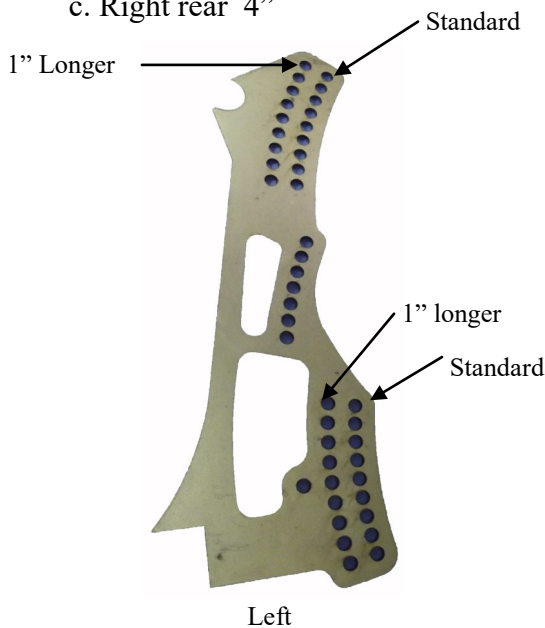
1. L.S. rods on outside of birdcage with supplied spacer
2. R.S. rods on outside of birdcage with supplied spacer
3. Right links mounted in center, Left links mounted towards right of brackets
4. Upper rods
  - a. 14" tube
  - b. 16 1/2" on center Left, 18" on center Right
  - c. 4th hole from top Right, 4th hole from top Left
  - d. Standard holes (1" longer rod optional for Left Upper on frame)
  - e. center hole on bridgase (4 1/2")
5. Lower rods
  - a. 12" tube
  - b. 15 1/2" on center Left, 15 3/4" on center Right
  - c. 3rd hole from top Right, 2nd hole from top Left
  - d. Standard holes (1" longer rod optional for Left Lower, 1 1/2" short Right Lower adapter bracket available)
  - e. center hole on birdcage (4 1/2")
6. R.R. Z-link
  - a. 14" Tube
  - b. 17 1/2" on center
  - c. Second hole from bottom

### I. Square Rear

1. Set 4 link rods accurately or
2. Drop a plumb bob from axle tube and measure to 2 x 2 outriggers

### J. Rear Shocks Angles

1. Over rail rear clip (gap between frame rail to center of shock brkt.)
  - a. Left rear front 2 1/2"
  - b. Left rear behind 1 3/4"
  - c. Right rear 4"



# GENERAL INFORMATION

## III. Set Up-scale with driver

- A. Fuel 20 Gallons
- B. Wheel offsets
  - 1. Front– 3” w/ 1” wheel spacers
  - 2. Rear- 3”
  - 3. Super slick– put 4” on right rear, add an additional 1/2” spacer to RF
  - 4. Super tacky– put 1” wheel spacer on right rear
- D. Percentages
  - 1. Left side– 54.5%
  - 2. Rear– 55%
- E. Bite
  - 1. Tacky 60# Left rear
  - 2. Average 80# Left rear
  - 3. Slick 100# Left rear

## IV. Miscellaneous

- A. Wheelbase-110 “
- B. Brakes-Metric calipers w/.810 or 1” rotors
  - 1. LF, LR, RR– 2 3/4” piston
  - 2. RF– 2 3/8” piston
- C. Master cylinder
  - 1. Front– 7/8”
  - 2. Rear– 7/8”
- D. Rear End
  - 1. 60” Track centered
  - 2. 30 1/2” axles
- E. Drive shaft length
  - 1. Bert– 33 1/2”
  - 2. Brinn/Falcon– 30 1/2”

## V. Remember

- A. All recommendations listed are general. Your situation may vary.
- B. All adjustments are a compromise. Think through what you are doing.
- C. Different race tracks require different combinations, due to Driver...
  - 1. Style
  - 2. Technique
  - 3. Experience

B.R.C. is interested in helping you all we can!

Simply pick up the phone and call our tech line at (717)-865-6691.

All calls will be answered or returned. Or e-mail us at [lazerchassis@comcast.net](mailto:lazerchassis@comcast.net)

Use your computer for help. <http://www.bernheiselracecars.com>

# Open Wheel Modified

## PARTS LIST

### **Front Suspension**

Upper ball joint holder– 22-0156  
Control arm tubes– 19005, 19006, 19007  
Upper ball joint– 20034-1/ Howe 2232012  
Tubular Left lower control arm– 88010  
Tubular Right lower control arm– 88020  
Lower ball joint– 20036/ Howe 22412  
LF Spindle– 30436L  
RF Spindle– 30436R

### **Steering**

LF tie rod– 19016  
RF tie rod– 18015.5DB  
Tie rod end– 30239/ Howe 23270  
Idler Arm– 30261/ Howe 23432  
Center link– 30270/ Howe 23399  
Steering box– 206-06200  
Pitman arm– 84091

### **4-Link Rear Suspension**

Birdcage (either side)– WM200NDS  
Bolt on shock mount– WM2211500S  
Lift bar– 29201M  
Lower radius rod tubes– 19012 RS/ 18012 LS  
Upper radius rod tubes– 19014 RS/ 19013 LS  
Lift bar link rod– 19007  
Panhard bar– 307-4205  
Pinion mount- WM219  
Integral Panhard Mount– 82159 Steel/ 83076 walk up  
Roller Coil-over Eliminator– WM251-2  
6th Coil– WM223400S

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# **Shock and Spring Packages**

### **I. L.R. Behind– Baseline**

A. RF– 73-10 w/ 600

B. LF– 75-7 w/ 500

C. RR– 94 w/ 13” 200

D. LR– 98-2 (front) Coil-over Eliminator w/ 16” 150 (behind)

### **II. 5th Coil– 93-5 shock with 11” 250 spring, center hole**

III. LR drop– limit by chain clamped to the center of the axle tube (use part #84175– kit includes chain, frame mount, and rear end mount. 15” from axle tube to ride height tab baseline

## **Please Remember:**

**These are basic setups designed to give you a base line starting point. Your situation may require additional tuning.**



## Tech Tips

### I. Four Link

- A. More angle upward angle on rods (toward chassis) increases loading on that wheel (up in front, down in back)
- B. Rod angle changes also affect roll steer (typically lowering the lower rods at the frame decreases roll steer)
- C. Roll steer generally loosens the car through the center
- D. Lowering left upper rod on birdcage greatly increases drive off
- E. Specific rod angles
  1. Drop right upper for slick track
  2. Drop left upper for tacky track
  3. Raise right lower for tacky track
  4. Raise left lower for slick track

### II. Lift bar

- A. Longer and softer on the 5th coil brings weight transfer/bite in slower but lasts longer
- B. Shorter and stiffer on the 5th coil brings weight transfer/bite in faster but does not last long

### III. Panhard bar

- A. Shorter and more angle exaggerates wheel loading increasing side bite for a shorter time
- B. Longer and flatter smoothes out wheel loading and side bite

### IV. Ballast

- A. Higher ballast causes the car to move around more (side to side and front to rear) increasing amount of weight transfer
- B. Lower ballast settles car down by limiting weight transfer

### V. L.R. behind setup

- A. Amount of lift (roll-up) can be controlled by changing length of LR chain limiter
- B. Soft extension valving allows car to roll faster (valving controls speed,)

### VI. Watts Link

- A. Many Lazer Chassis cars are equipped with a Watts Link bracket on the RR
- B. Remove RR top 4 link bar and install a new one going towards the rear
- C. This will loosen on throttle handling

## VII. Driving

- A. Momentum and slick tracks require more driver finesse and a smoother less radical setup
- B. Stop and go tracks and traction tracks can more easily handle a radical combination and a stomp and steer driver

Notes:

