



**2011-2013**

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Dear Valued Customer,

Congratulations on your purchase of a precision crafted Lazer Racing Chassis by Bernheisel Race Cars. We take great pride in supplying the high level of quality and service our customers have come to know and expect.

On the bottom of this page is your chassis serial number. Please refer to this number when calling for parts or technical assistance.

Our goal is to help you improve your racing program no matter what level you are now racing at. The following pages should assist you in that regard. You are also welcome to access our website @ [www.bernheiselracecars.com](http://www.bernheiselracecars.com) or call our tech line at 717-865-6691 for further information.

Thank you and Good Luck. Jim Bernheisel-president

Customer:

Serial:

Date:

### **DISCLAIMER OF WARRANTY**

*AUTO RACING IS A DANGEROUS SPORT.*

*THE SELLER HEREBY EXPRESSLY DISCLAIMS ALL WARRANTIES, EITHER EXPRESSED OR IMPLIED. INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE SELLER NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY LIABILITY IN CONNECTION WITH THE SALE OF THIS MERCHANDISE.*

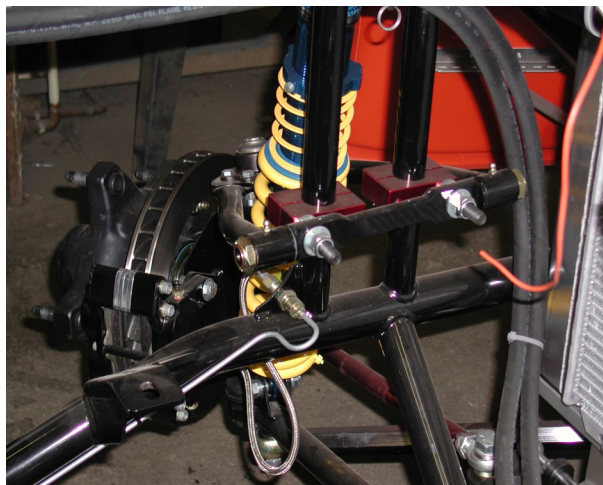
*THE PURCHASER ASSUMES ALL RESPONSIBILITY*



## *Front Suspension*

### *I. Black/Diamond Front End (Black RF/ Diamond LF spindles)*

- A. Upper Control Arms
  - 1. Right– 8 1/4" w/ 3/4" spacers
  - 2. Left– 11 1/2" - Mounted inside frame
- B. A-arm sliders – top of frame to top of block
  - 1. Single position mounts
    - a. Left front– 5 3/8"
    - b. Left rear– 5 1/8"
    - c. Right front– 3 3/8"
    - d. Right rear– 3 1/8"
  - 2. Dual position mounts
    - a. Left front– 5 3/8"
    - b. Left rear– 5 1/8"
    - c. Right front– 4 3/8"
    - d. Right rear– 4 1/8"
  - 3. Dual position mounts
    - a. Left side– use top holes
    - b. Right side– use bottom holes
- C. Lower control arms
  - 1. Left– 16 5/8" on center
  - 2. Right– 19 3/4" on center
- D. Strut rods– Initial setting- As short as possible
  - 1. LF Front strut– 21" tube
  - 2. RF Rear strut– 19" tube

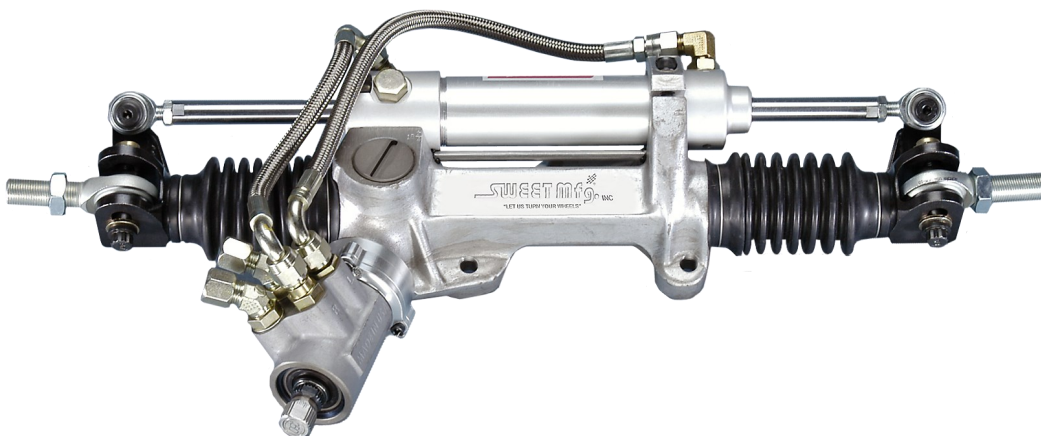




## *Front Suspension-continued*

E. Rack spacers-at mount ( Center rack in slots on frame bracket ) 1/4"

**Sweet w/ slotted rack eyes recommended**



F.

18 1/4" Rack- baseline 4" w/ .220 servo

G. Bump steer spacers

1. Standard spindle RS- 1/8" spacer LS- 1/2" spacer
2. Ackerman spindle RS- 3/8" spacer LS- N/A
3. At rack- Sweet Slotted- Put tie rods in bottom of slots  
Any style rack- Lay a straight edge across top of main frame rails. From top frame to center of heim 5 5/8" on both sides.
4. Ackerman spindle steering arm settings (center of ball joint to center of heim)  
RS- 5"



H. Tie rod tubes- 16" tube RS ( Use RS to adj. Toe out )  
14" tube LS ( 17" Center to Center )





## *Front Suspension-continued*

### I. Alignment

1. Camber— Right side, 5 1/2 degrees Neg. Left side, 5 degrees Pos.
2. Caster— Right side, 5 1/2 degrees Left side, 2 1/2 degrees
3. Toe 5/8" out
4. Bump steer— If Rack & Tie-Rod spacers are used as Instructed, Bump Steer Will be Correct
5. Alignment Procedure
  - Place the chassis on 4 jack stands
  - Level car front to back & side to side
  - Remove coil-overs
  - Support lower control arms to simulate ride height (use #8415 ride height sticks)
  - Adjust strut rod length to set *caster*
  - Space upper control arm in & out to set *camber*

### J. Front ride height

1. Right lower control arm 1.5 – 2.2 degrees
  2. Left lower control arm 2.8 – 3.5 degrees
- Both are uphill from chassis to wheel





## *Link Rear Suspension*

### *II. 4 Link Rear Suspension*

A. Lift Bar Slider– 13 1/4” center to center from top right rail

B. Lift Bar– Adjustable 30” - 44”

1. 5/8” Bolt in top (grade 8)- Head @ Heim
2. 1/2” Bolt in bottom (grade 8)- Head @ Heim
3. 7/8” Spacer between rod end and plate
4. Mount on right side of aluminum plate
5. Use spacer for strength between plates
6. Initial setting– 4th hole (middle)
7. Lift bar side brace- 7” tube 10 1/4” on center
8. Rear end through bolts on lift bar plates torque to 35 ft. lbs.  
( Over tightening can cause breakage)



C. Rear End Adjustment (side to side)

1. Left upper torque arm plate to left ride height tab– 13 1/4” w/Ride height @  
8 7/8” LR and 8 5/8” RR
2. Panhard bar
  - a. R.S. pinion- 2nd from bottom (4 hole mount) 0 mark on slotted mount
  - b. At frame w/ 3 position bracket. 3rd hole from top #3– Middle row of holes  
0 mark on slotted mount
  - c. 21” center row ( Note option for 19” or 23” Panhard ) 21” is baseline setting  
19” recommended for stop and go or slick tracks  
23” recommended for rough and extremely heavy tracks



4 Hole Mount



Walk-up Mount



Walk-up Brkt.



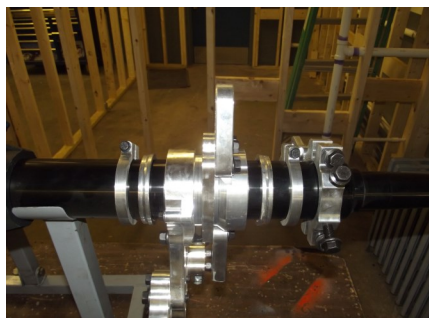
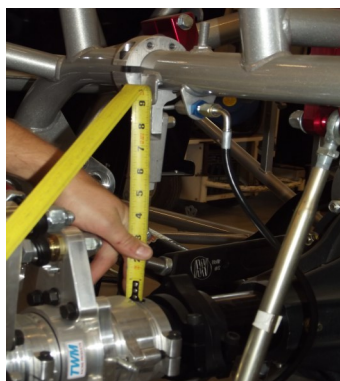
3 Position Brkt



## 4 Link Rear Suspension- Continued

### D. Rear Ride Height

1. TWM birdcages– tab to top of birdcage body ( Smallest part of birdcage )
  - a. Left ??? Depends on LR bite ( 8 7/8" to 9 3/4" )
  - b. Right 8 5/8"



### E. Pinion Angle– 7.5 degrees negative- Put angle finder on rear cover nuts

### F. Birdcage– Assembly and Location

#### 1. Shock Brackets

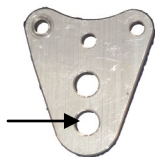
- a. L.S. Front– top holes– inside of birdcage (adjust to allow chain to limit drop)  
Use #84175B to limit LR axle drop. Drop is measured axle tube to tab. Reference setup packages for drop measurement.
- b. L.S. Rear– lower holes outside of birdcage towards the wheel
- c. R.S. Front– lower holes outside of birdcage towards center of the car
- d. both RR and LRB are 6" of drop measure from the bottom of the axle tube

#### 2. Location on axle tube

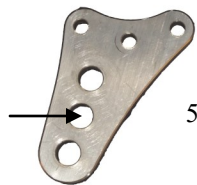
- a. Left side– inside of rotor to center of behind shock bracket 6 1/2"
- B. Right side– located by caliper bracket



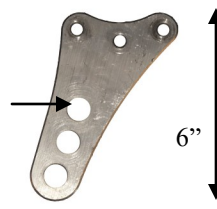
upper rod



Both lower rods  
Bottom hole neutral



Long left lower  
Middle hole neutral



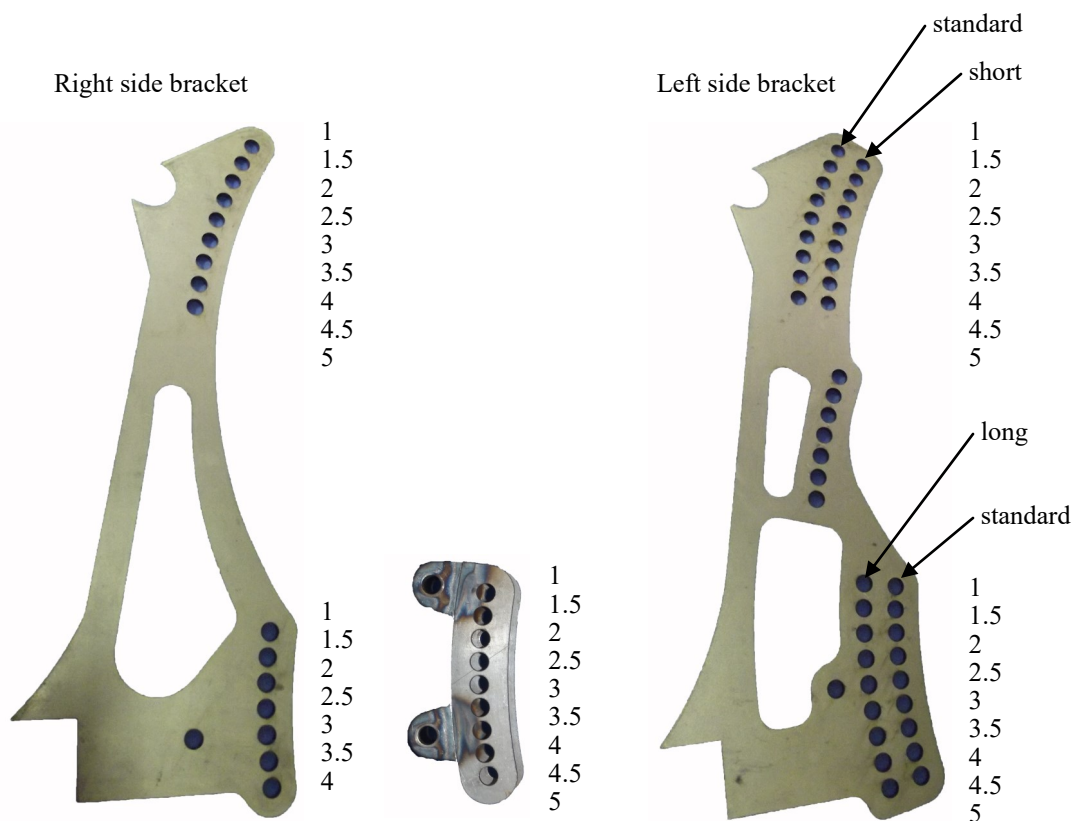
Extra Long left lower  
Top hole neutral



## 4 Link Rear Suspension- Continued

### H. TWM Birdcages 4 Link Rods-Neutral Setting

1. L.S. rods on outside of birdcage with supplied spacer
2. R.S. rods on outside of birdcage with supplied spacer
3. 4 link rods in frame brackets installed w/ BRC spacer # 83040, On LS rods install all the way to the right w/ #83040. use spacer #83041 on left side of heim
4. Upper rods
  - a. 14" tube
  - b. 17 1/2" on center
  - c. LS- Long rod standard (1" short rod optional) # 1 Index on bridgeage
  - d. RS- # 1 Index on birdcage
  - e. Frame hole from top- # 2.5 LR, #3 RR
5. Lower rods
  - a. 12" tube
  - b. 15 1/2" on center (LS short rod standard, 1" long rod optional)
  - c. Frame hole from top- #2.5 both sides
  - d. Neutral holes on birdcage (reference pictures on page 10)



Short Right lower #8410-1





## *4 Link Rear Suspension- Continued*

### J. Square Rear

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

### K. Damper Shock– 6” shock with 2” extension or an 8” shock

1. Center hole on rear (vertically)
2. Back holes on frame plate
3. 2nd hole from top on frame

### L. Rear Shocks Aluminum Brackets

1. Over rail rear clip (gap between frame rail and slider mount)
  - a. Right 3 1/2”
  - b. Left Front 3 1/4”
  - c. Left Behind 2”

### M. 5th Coil Pre-load

1. 7” Shock
2. 10” Spring
3. Center hole on lift bar
4. Back off when scaling car
5. Adjust nut until coil is seated
6. Pre-load– reference setup pages
7. Straight up & down– No angle

### N. Rear Alignment Procedure

- Place the chassis on 4 jack stands
- Level car front to back and side to side
- Remove rear coil-overs
- Support rear housing to simulate ride height (use #8415 ride sticks)
- Set 4-link rods center to center
- Adjust Mini-sixth coil to set pinion angle
- Adjust panhard bar to set side to side measurement



## *General Information*

### III. General Information

A. All scale work with 15-20 Gallons of Fuel and driver

B. Wheel offsets a

1. Standard– all 5” off
2. Slick– 6” off RR
3. Super Slick– 6” off RR and 1” wheel spacer on RF

C. Stagger

1. Front– 1”
2. Rear– 3 1/2”

D. Percentages

1. Left side– 54.5%
2. Rear– 53.5-54.5%

( Note: w/driver- w/ 15 or 20 gallons of fuel )

E. LR Bite

See set-up packages for recommended weights

F. Drive Shaft

1. Bert Ballspline– 38”-38.5”
2. Std. Bert– 38” with extra long yoke
3. Brinn & Falcon– 35”-35.5” with extra long yoke

G. Master cylinder

<u>Tacky Track</u>	<u>Slick Track</u>
1. Front– 1”	Front– 7/8”
2. Rear– 7/8”	Rear– 1”

H. Axles

1. R.R. 36”
2. L.R. 32 1/2”



## *Replacement Parts*

### *IV. Replacement Parts*

#### **Standard Front Suspension Hybrid Strut**

Left upper control arm– 11120DBJS

Right upper control arm– 30810S

Upper ball joint– 20031 LS / 20034 RS

Left lower control arm– 21160

Right lower control arm– 21195

Lower ball joint– 20036

Strut tube– 14019 RS / 14021 LS

Strut end– RD5 RS / RD3 LS

Tie rod tube– 18016 RS / 12014 LS

Diamond left spindle– 30397-1

Standard right spindle– 30398

Ackerman right spindle– 40398A

5/8 Heims– CM10 / CM10L

5/8 Jam Nuts– SJNR10 / SJNL10

3/4 Heims– CM12 / CML12

3/4 Jam Nuts– SJNR12 / SJNL12

3/4 to 5/8 reducer– 10475

#### **Front Suspension Options**

Howe upper ball joint– 22300 LS / 22320 RS

Howe lower ball joint– 22412

Joe's bearing right upper control arm– 15705-slb

Joe's bearing left upper control arm– 15370-slb



## *Replacement Parts continued*

### **Rear Suspension**

TWM Left Birdcage– 119-341860

TWM Right Birdcage– 119-421560

Bolt on shock mount– 20390

Lift bar– 29201

Lift bar plates– 29100 (alum.) 29100S (steel)

Lower radius rod tubes– 12012

Lower bent radius rod tubes– 18012

Upper radius rod tubes– 12014

Lift bar link rod– 12007

Panhard bar– 20225K-21

Walk-up pinion mount– 84027

Walk-up frame mount– 83076

Full swivel 6th coil– 26401





## *Set-up Packages*

### *V. Set-up Packages*

*Note: All setups based on AFCO Silver Series, Ohlins LMP or LMJ, or Genesis G1. Both Left Rear shocks should be approximately 25" fully extended*

#### *A. Soft Left Rear-Baseline Setup*

1. Springs– call our shock department for the latest spring combinations

L.F.	500#	R.F.	300#
(Behind) L.R.	150#	R.R.	250#

2. Shocks- call our shock department for the latest information
3. 4-Link Bars, All neutral settings
4. Panhard, All standard settings
5. 80-100# L.R. Bite
6. 5th Coil 3rd hole from front- 300# spring 73-5 shock 1/4" Preload
7. 14 3/4" LR drop limited by chain

**NOTES:**