

# LAZER CHASSIS ETW

ENGINEERED TO WIN!!!

## 2023

Serial # 2080 and up



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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:

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Date:

### **DISCLAIMER OF WARRANTY**

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## *Front Suspension*

### *I. "X" Factor Front End*

- A. Upper Control Arms
  - 1. Right– 8 1/2" w/ 3/4" spacers
  - 2. Left– 12" - Mounted inside frame
  
- B. A-arm sliders – top of frame to top of block
  - 1. Dual position mounts
    - a. Left front– 4 3/8"
    - b. Left rear– 4 1/8"
    - c. Right front– 4 1/8"
    - d. Right rear– 3 7/8"
  - 2. Dual position mounts
    - a. Left side– use top holes
    - b. Right side– use top holes
  
- C. Lower control arms
  - 1. Left– 16 3/8" on center– 1/4" spacer between lower and frame
  - 2. Right– 19 7/8" on center
  
- D. Strut rods– no spacer RF, 1" spacer LF (between strut rod heim and frame)





## *Front Suspension-continued*

**Sweet w/ upside down slotted rack eyes and double RF**



- E. Rack bolts directly to frame without a spacer
- F. 18 1/4-19 1/4" Rack— baseline 4" w/ .220 servo
- G. Bump steer spacers and Ackerman settings
  - 1. Ackerman spindles
    - a. RS— 3/8" spacer, set adjustable steering arm to 4 3/4" center of tie rod to center of ball joint
    - b. LS— 3/8" spacer, set adjustable steering arm to 5 1/8" center of tie rod to center of ball joint
  - 2. At rack
    - a. RS— center of slot
    - b. LS— bottom of slot
- H. Tie rod tubes— 17" tube RS—Use RS to adj. Toe out )  
13" tube LS— 16 3/8" center to center ackerman spindle
- I. note: RF requires 1/2" short lower ball joint and 1/2" long upper ball joint



## *Front Suspension-continued*

### J. Alignment

1. Camber– Right side, 5 1/4 degrees Neg./ Left side, 8 1/2 degrees Pos.
2. Caster– Right side, 5 degrees Pos./ Left side, 3 degrees Pos.
3. Toe 1/2" 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 #8415-2 ride height sticks)
  - Adjust rod end length to set *caster* (rear rod on right, front rod on left)
  - Space upper control arm in & out with washers to set *camber*
  - Any deviation in procedure will result in incorrect alignment

### K. Front ride height

1. Right lower control arm 17" center to center, 4 degrees
2. Left lower control arm 18 1/2" center to center, 4 degrees  
Control arm angle is uphill from chassis to wheel

### L. Set LF tether- 18 1/2" center to center by measuring the shock mounts

1. Less drop– car will steer better, will unstick RR in center
2. more drop– car will not steer as positively, will stick RR a little more





## 4 Link Rear Suspension

### II. 4 Link Rear Suspension

#### A. Lift Bar– Steel adjustable (BRC)

1. 5/8" Bolt in top and bottom- Head @ Heim (older cars used a 1/2" top bolt, for strength we recommend 5/8")
2. 1/4" Spacer between rod end and plate (Steel)
3. Mount on right side of plates
4. Use spacer for strength between plates
5. 5th Coil Initial setting– 2nd hole from front
6. Lift bar side brace- 7" tube 10 1/4" on center (Steel Lift bar, brace to frame)
7. Rear end through bolts on lift bar plates torque to 35 ft. lbs.  
( Over tightening may cause failure)

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

1. Left upper torque arm plate to left ride height tab– 14 1/2" w/Ride height @ 9 3/8" LR and 8 5/8" RR (see example on page 7)
2. Panhard bar
  - a. R.S. pinion- -1/2" mark (2 dashes) below 0 on walk-up mount
  - b. At frame-1 mark (below 0) on walk-up mount
  - c. 21"



Walk up bracket  
83079



Walk-up Mount  
84029

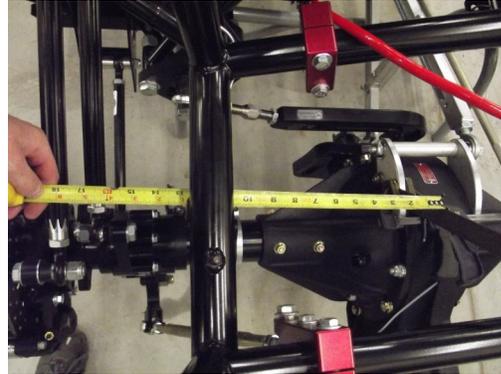
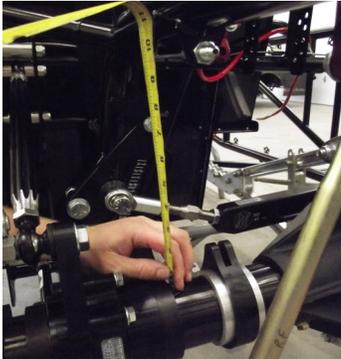




## 4 Link Rear Suspension- Continued

### D. Rear Ride Height

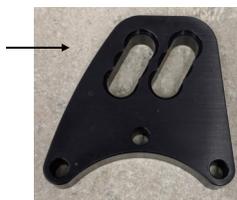
1. Wehr's birdcages– tab to top of bird cage clamp bracket
  - a. Left 9 3/8"
  - b. Right 8 5/8"



- E. Pinion Angle– 6 (84) degrees negative- Put angle finder on rear cover nuts, use 6th coil chain to make 5th coil 18 5/8" (cannot run downhill), fine tune pinion angle with lift bar heims. 5th coil must be preset on smasher. 6th coil preload should be set to 1/2" on work bench. (4" tall 6th coil spring would be pre-loaded (compressed) to 3 1/2")

### F. Birdcage– Assembly and Location

1. Shock Brackets
  - a. L.S. Front– inside of birdcage (adjust to allow chain to limit drop)
  - b. L.S. Rear– up 1 set holes, outside of birdcage towards the wheel (6")
  - c. R.S. Front– bottom holes outside of birdcage towards outside of the car (6")
2. Location on axle tube
  - a. Left side– outside of rotor to center of behind shock bracket 8 1/4"
  - b. Right side– outside of rotor to center of front shock bracket 8 3/8"



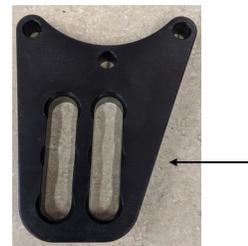
Left upper rod  
Top front hole neutral



Right upper rod  
Top hole neutral



Right lower rod  
Bottom hole neutral



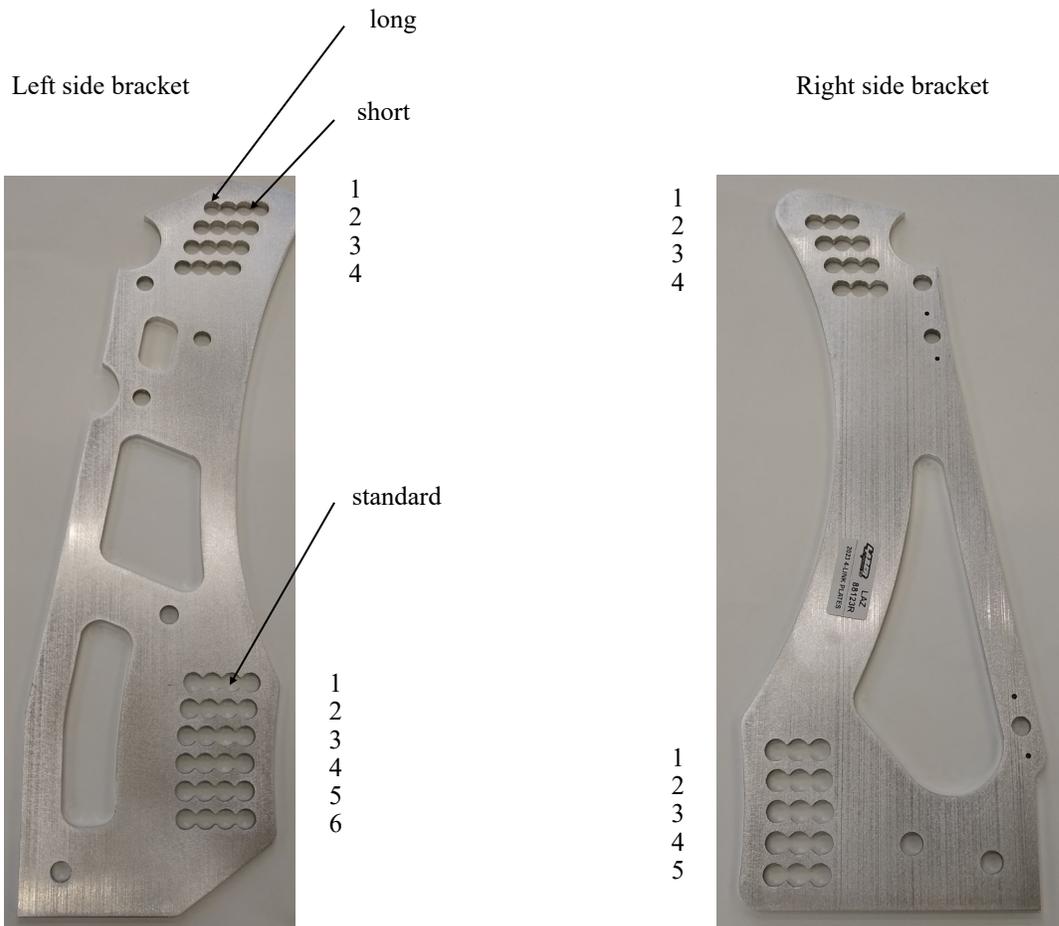
Left lower rod  
Middle back hole neutral



## 4 Link Rear Suspension- Continued

### H. Wehrs 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. RS rods installed in center with spacers #83040, LS rods install all the way to the right w/ #83041 spacer and use spacer #83040 on right side of heim
4. Left Upper rod
  - a. 13" tube (short, second row in from the back) 14" tube (long/standard, front row)
  - b. 16 1/4" on center (short) 17 1/4" (Long/standard)
  - c. #4 on frame
  - d. #1 hole on birdcage (reference pictures on page 7)
5. Left Lower rod (bent steel)
  - a. 12" tube
  - b. 15 3/4" on center
  - c. #1 on frame, second row in from the back
  - d. Neutral holes on birdcage (reference pictures on page 7)





## *4 Link Rear Suspension- Continued*

6. Right Upper rod
  - a. 14" tube
  - b. 17 1/2" on center
  - c. #3 on frame (middle row)
  - d. #1 hole on birdcage (reference pictures on page 7)
  
7. Right Lower rod
  - a. 12" tube (standard)
  - b. 15 1/2" on center (standard)
  - c. #2 on frame (middle row)
  - d. Neutral hole on birdcage (reference pictures on page 7)
  
8. 4 link brackets are in rows of 1/2" increments to change wheel base on the right or left by moving both rods forward or backward. On the left side the rows are also utilized for "zero index", moving the entire rod backward 1" on the frame and cage (upper rod) or forward 1" on the frame and cage (lower rod).

### K. Rear Shocks Aluminum Brackets-

1. 2 Pos. Right 2 3/4" to center of outside 1/2" bolt from RR frame rail (#20395 mount) Outboard 19 7/8" center to center, Inboard 20 1/4" center to center
2. Left Front 2" gap between mount and frame rail (#20394 mount)
3. Left Behind 2 7/8" LR frame rail to center of 1/2" bolt (#20392 mount) 19 1/4" center to center

1.



2.



3.



### M. 5th Coil- 18 5/8" center to center 125# load

1. multi adjustable mount
2. Location- reference setup packages
3. Straight up & down- No angle



## *4 Link Rear Suspension- Continued*

### 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 #8415-2 ride sticks)
- Set 4-link rods center to center
- Adjust sixth coil to set loaded 5th coil to 18 5/8" center to center, use heims on lift bar to set pinion angle
- Adjust panhard bar to set side to side measurement

### O. Left Rear Chain Limiter

1. Use #WM380WHT (droop rule) or #LAZ 91366 (open rules)
2. With bearing limiter against left side bell
3. All drop settings are in the setup packages
4. Drop is measured axle tube to tab

### P. Right Rear Chain Limiter

1. Use #LAZ 91367
2. mounted to center bolt of bird cage
3. Length of chain is 4 links
4. Center to center of RR shock hanging on limiter is 23 1/4"

### Q. LR Axle Tube Shock bracket

1. Bracket mounted against LR bird cage
2. With the rear hanging on the droop limiter the 1/2" bolts of the bracket should be at the 12 and 6 o'clock positions





## *General Information*

### III. General Information

- A. All scale work with 15 Gallons of Fuel
- B. Wheel offsets all 5"
- C. Stagger
  1. Front– 1"
  2. Rear– 3-4"
- D. Percentages- All percentages with driver in car.
  1. Left side– 54.5%
  2. Rear– 52.5-53.5%
- E. LR Bite
  - See set-up packages for recommended corner loads
- F. Drive Shaft
  1. Bert Ballspline– 37.5"
  2. Std. Bert– 37" with extra long yoke (make sure input shaft is splined correctly)
  3. Brinn & Falcon– 34" with extra long yoke
  4. Falcon Roller Slide– 36.5"
- G. Master cylinder
  1. Front– 1"
  2. Rear– 7/8"
- H. Axles and Tubes
  1. R.R. 35 1/2" axle, 29 1/8" tube
  2. L.R. 33" 1/2" axle, 27 1/8" tube
- I. RR wheel spacer– 2- 1/2" on RR, remove as needed, can move to RF
- J. Calipers
  1. 1 3/8" RF
  2. 1 5/8" LF
  3. 1 3/4" Rears



## *Replacement Parts*

### *IV. Replacement Parts*

#### **“X” Factor Front Suspension Hybrid Strut**

Left upper control arm– 15380SLB  
Right upper control arm– 15710-20SLB  
Left upper ball joint– 22320  
Right upper ball joint– 22329 (housing), 22335 (stud)  
Left lower control arm– 21197-1  
Right lower control arm– 21198-1  
Left lower ball joint– 22412  
Right lower ball joint– 22450 (housing), 2244105 (stud)  
Tie rod tube– 11013 Left, 11017 Right  
Standard left spindle– 50397A  
Standard right spindle– 50399  
5/8 Heims– CMX10 / CMXL10  
5/8 Jam Nuts– SJNR10 / SJNL10  
LF tether– 21397



## *Replacement Parts continued*

### Rear Suspension

Left Birdcage– 300LR  
Right Birdcage– 300RR  
Bolt on shock mount– 20390 (LRF) 20392 (LRB), 20395 (RR)  
5th/6th coil mount– 33617  
Lift bar– 29222  
Lift bar plates– 29117S (steel)  
Right lower radius rod tube– 11012  
Right upper radius rod tube– 11014  
Left lower bent radius rod tube– 18012  
Left upper radius rod tube– 11014  
Lift bar link rod– 11007  
Panhard bar– WM40S19-21  
Walk-up pinion mount– 84029  
Walk-up frame mount– 83079  
Full swivel 6th coil– WM80  
LR limiter for frame– WM380WHT (droop rule), 91366 (open)  
RR limiter for frame– 91367  
Bearing limiter for left rear– WM210AK  
Left 4 link plate– 88123L  
Right 4 link plate– 88123R



## *Set-up Packages*

### *V. Set-up Packages*

*Note: All setups based on any brand shocks tuned by Focus Shocks.*

#### *A. Baseline Setup*

##### 1. Springs

L.F.	10" 500#	R.F.	12" 275
(Behind) L.R.	16" 100	R.R.	12" 225

##### 2. Loads

L.F.	17- 700#	R.F.	18.5- 680#
L.R.	19 1/4- 600#	R.R.	19 7/8- 500#

3. 4-Link Bars, All neutral settings

4. Panhard, All standard settings at pinion and frame

5. 80-100# L.R. Bite (Do not adjust on scales! Set with spring loads)

6. 5th Coil- 2nd hole from the front, 300# spring 18 5/8" 125# load

7. 15 3/4" LR drop limited by chain

8. Note: The above springs are baseline linear spring combinations. All modern dirt late models require dynamic tunable combinations whether it be through stack springs, spring rubbers, or bump stops. Call our shock department for the latest set-ups to fit your rules and conditions.



## *Set-up Packages*

### *V. Set-up Packages*

*Note: All setups based on any brand shocks by tuned Focus Shocks. Both Left Rear shocks should be approximately 25" fully extended*

B. Spring options- Some of the popular configurations are listed below. Others are available. (Call to have a custom stack or bump built on our spring smasher for your specific situation.) We highly recommend having the items highlighted in **bold** built for your car. We have had tremendous success with these corners in tandem with each other/

1. Stack RF
2. Stack LR
3. **RR with Spring Rubbers**
4. **RF with Spring Rubbers and bump stop**
5. Stack RR
6. **Custom 5th coil**

C. We highly recommend setting the car up by setting the loads with a spring smasher. The only scale work will be to set total weight and percentages.

**NOTES:**