BORLAND
Racing Developments
Pty. Ltd.

SPECTRUM OWNERS MANUAL

SPECTRUM

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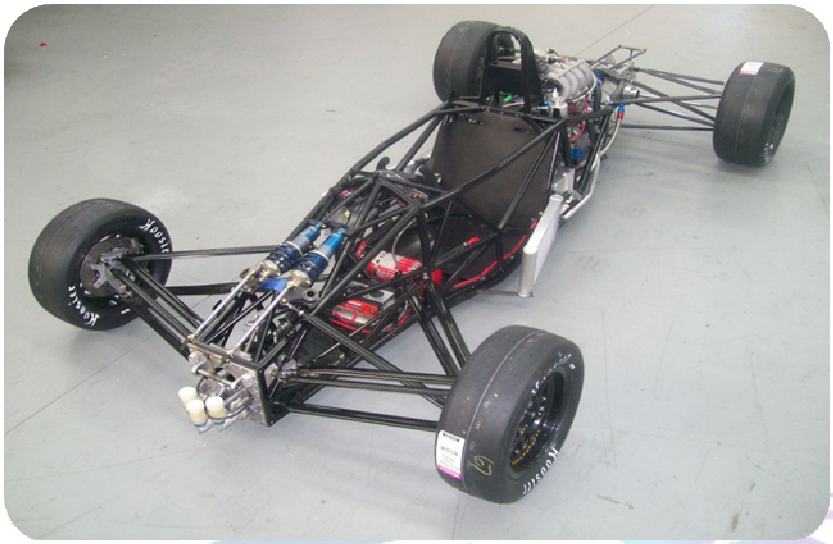
1 IMAGES



2 GENERAL DIMENSIONS AND SUPPLIERS

Wheelbase	102.5”	2.60m
Track Front	63.75”	1.62m
Track Rear	60”	1.52m
Overall Height	38”	.965m
Overall Body Width	37”	.940m
Overall Width	70.5”	1.79m
Overall Length	157”	3.99m
Weight (dry)	904lbs	410kg
Front Suspension	Dual Damper Pushrod Activated	
Rear Suspension	Dual Damper Pushrod Activated	
Bodywork	Gel Coated Fiberglass with Kevlar Intrusion	
Gearbox	Hewland LD200 4 Speed	
Dampers	Spectrum / Penske - 3 Way Adjustable	
Springs	Hyperco	
Fuel Cell	FIA FT3 Approved	
Extinguisher System	Lifeline 2000	
Radiators	Spectrum	
Steering Wheel	Momo Racing	
Oil Filter	Honda T9911	

Engine Oil	Mobil 1 Synthetic 0w-40
Gearbox Oil	Mobil 1 Synthetic 75w-90
Brake Rotors	Spectrum
Brake Calipers	AP calipers with DS3000 Ferodo Pads
Battery	Braille
Safety Harness	Willans
Wheels	Performance / OZ Racing

3 TIRE INFORMATION

Tire Dimensions depend on inflation pressure, rim width and camber angle.

Front Tire

Specification	20.5 x 7 x 13
Free Radius	66.6”
Hot pressure	17psi

Rear Tire

Specification	22.5 x 7.2 x 13
Free Radius	70.75”
Hot pressure	17 psi

Front Tire

Specification

Free Radius

Hot pressure

Rear Tire

Specification

Free Radius

Hot pressure

4 FLUID LEVELS

Engine Oil level is measured straight down through the filler neck on Bellhousing. Once hot the level should be between 1 to 2 inches (25 to 50mm) above the ledge. For tracks with large elevation changes it is normal to require just over 2 inches. The oil catch tank is located behind the oil tank and should be drained after 2-3 race meetings, this can be done by removing 1 or 2 bolts on the catch tank plate (rear plate underneath Bellhousing).

Fuel Tank capacity is 4.5 gallons (17L).

Gear Oil is 1 Liter, allow a little more for a brand new dry gearbox. Level can be checked by removing the plug on the lower right rear of the main case (21mm socket); the oil level should be 6mm below the hole.

5 TOOLS

Socket for Wheel Nuts	1”1/8
Socket for Stub Axle Nuts	1”1/8 x 4” Long
Torque for Wheel Nuts	100ft.lb
Torque for Stub Axle Nuts	120ft.lb

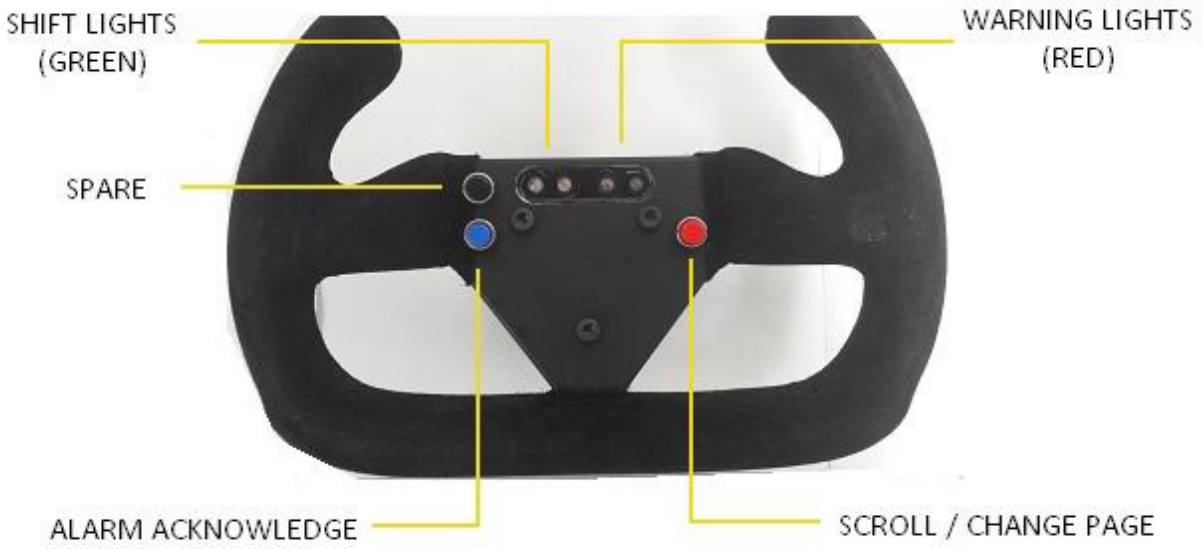
Spring Platforms are a ¼” or 6mm Pin Punch

Pin Punch for the low speed adjusters on dampers a 1/16" Diameter, 3/4" Pin length. 4” is the overall length from McMaster Carr, part # 3416A11.

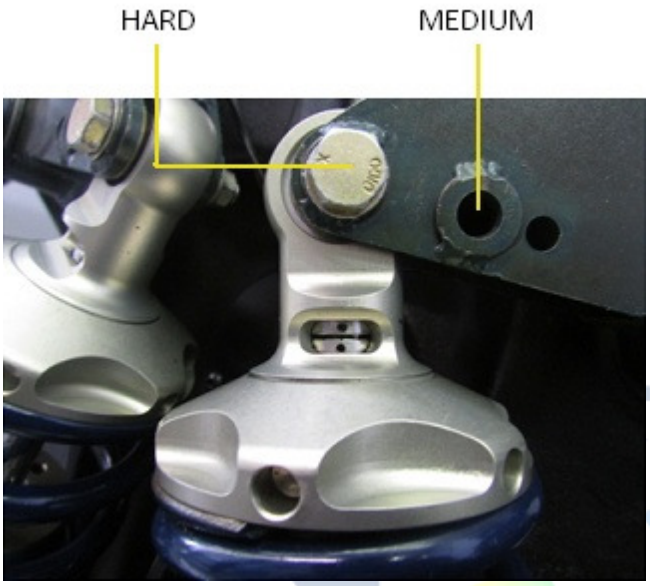
Use a 5/32” Allen Key for High Speed Bump adjuster.

6 COCKPIT

Hold scroll button down for 2 seconds to change page, practice page is blank as supplied from factory.



7 BELLCRANK INFORMATION



Both Front and Rear Bellcranks provide a hard or medium position for setup. Ride Height and droop must be adjusted accordingly via the pushrods and springs when changing between these settings.

Spectrum has 2 different versions of Rear Bellcrank available upon purchase of a new car. The pushrod pickup is located in a different position therefore each bellcrank has its corresponding length of pushrod. This changes the rear geometry to either Linear or Rising Rate through the wheel's range of motion.

Linear Pushrod = 474mm

Rising Rate Pushrod = 514mm

Each option provides a different feel in the various stages of a corner. The difference will rarely result in a change of overall lap time, ultimately it comes down to driver preference in regards to the cars handling characteristics. Both options have provided equal success on track over many years, recent examples are Matias Koykka using the Linear option to secure the 2012 Formula F Series, and Jake Eidson winning the 2013 Series using the Rising Rate.

8 DAMPERS

The bump adjuster is closest to the eyelet and the rebound closest to the spring.

The bump adjuster rotates independently of the rebound adjuster, meaning that the rebound adjuster should not rotate when making sweeps on bump. There is no need to hold the bump adjuster when making sweeps on rebound.

Starting point is adjusters wound clockwise into the shaft to 0, amount of clicks back out is the setting. Range is 0-30 clicks. High speed bump adjuster is counted the same way, range is 0-40 clicks.

9 MEASUREMENTS AND REFERENCE POINTS

The front ride height is measured 700mm rearward of the front bulkhead, under the rear leg of the front lower wishbone.

The rear ride height is measured on the flat surface just in front of the rear skid, under the bell housing.

Front castor is measured lock to lock or off the camber block, and set after camber, toe and ride height are complete. Repeat toe, camber and ride height after castor is set.

Rear castor is set zero on top of camber block, referenced from the machined top part of gearbox.

Droop is measured with a level across the top of front and rear tires, driver in car & hot pressures set, measure straight down from level to a reference point (e.g., machined surface on top of gearbox) write down measurement then jack car up, once the tires are free to spin re-measure the distance and the difference will be your droop, turn spring perches to adjust.

Settings for anti-roll bars are measured from center of ARB to center of clevis.

Roll Center positions on setup sheets are the rod end position.

10 SUGGESTED SETUPS

These setups are with driver, full fuel load and hot pressures. We suggest having the dampers wound off to a reference point each time a setup is required.

Linear Bellcrank Setup

Front

Ride Height	32mm
Toe	1mm in per side
Ackermann	Inner Hole
Springs	200lbs
Preload	37 turns or spring length of 95mm
Motion Ratio	Medium
Roll bar	73mm - ½" Diameter
Castor	4 Degrees
Camber	1 Degree Negative
Droop	2mm
Roll Center	Bottom

Rear

Ride Height	36mm
Toe	1mm in per side
Springs	250lbs
Preload	11 turns or spring length of 136mm
Motion Ratio	Hard
Roll bar	83mm – ½" Diameter
Castor	0 degrees
Camber	.6 degree negative
Roll center	Top
Upper Mount	Top

Rising Rate Bellcrank Setup

Front

Ride Height	32mm
Toe	0mm
Ackermann	Outer Hole
Springs	250lbs
Preload	Spring Length of 104mm
Motion Ratio	Medium
Roll bar	65mm - ½" Diameter
Castor	6 Degrees
Camber	1 Degree Negative
Droop	2mm
Roll Center	Bottom

Rear

Ride Height	36mm
Toe	1mm in per side
Springs	350lbs
Preload	Spring Length of 148mm
Motion Ratio	Hard
Roll bar	83mm – ½" Diameter
Castor	0 degrees
Camber	.6 degree negative
Roll center	Bottom
Upper Mount	Top

Linear Bellcrank Setup

Front

Ride Height	* mm
Toe	0mm
Ackermann	Inner Hole
Springs	200lbs
Preload	37 turns or spring length of 95mm
Motion Ratio	Medium
Roll bar	* mm – *” Diameter
Castor	4 Degrees
Camber	* Degree Negative
Droop	2mm
Roll Center	Bottom

Rear

Ride Height	* mm
Toe	* mm in per side
Springs	250lbs
Preload	11 turns or spring length of 136mm
Motion Ratio	Hard
Roll bar	* mm - *” Diameter
Castor	0 degrees
Camber	* degree negative
Roll center	*
Upper Mount	Top

11 HANDLING CHART

Low Speed Entry	Low Speed Middle	Low Speed Exit	High Speed Entry	High Speed Middle	High Speed Exit	**Possible Solutions (Best First)**
Understeer						
						Increase Rake
	Understeer					**Increase Front Rebound (5 to 3)** **Soften Front / Stiffen Rear ARB**
		Understeer				**Increase Front Rebound** **Soften Front / Stiffen Rear ARB** **Increase Rear Bump**
			Understeer			**Increase Rake**
				Understeer		**Increase Rake** **Increase Front Rebound**
					Understeer	**Increase Rake** **Soften Rear Rebound**
Oversteer						
						Decrease rake
	Oversteer					**Decrease Front Rebound (3 to 5)** **Stiffen Front / Soften Rear ARB**
		Oversteer				**Decrease Front Rebound** **Stiffen Front / Soften Rear ARB** **Decrease Rear Bump**
			Oversteer			**Decrease Rake** **Decrease Rear Rebound**
				Oversteer		**Decrease Rake** **Decrease Front Rebound**
					Oversteer	**Decrease Rake** **Increase Rear Rebound**

SPECTRUM 014 RIDE HEIGHT CHART

Number of Flats	Rear Ride Height	Front Ride Height
0	40.0	40.0
1	40.9	40.2
2	41.7	40.4
3	42.6	40.6
4	43.5	40.8
5	44.4	41.0
6	45.2	41.2
7	46.1	41.4
8	47.0	41.6
9	47.9	41.8
10	48.7	42.0
11	49.6	42.2
12	50.5	42.4

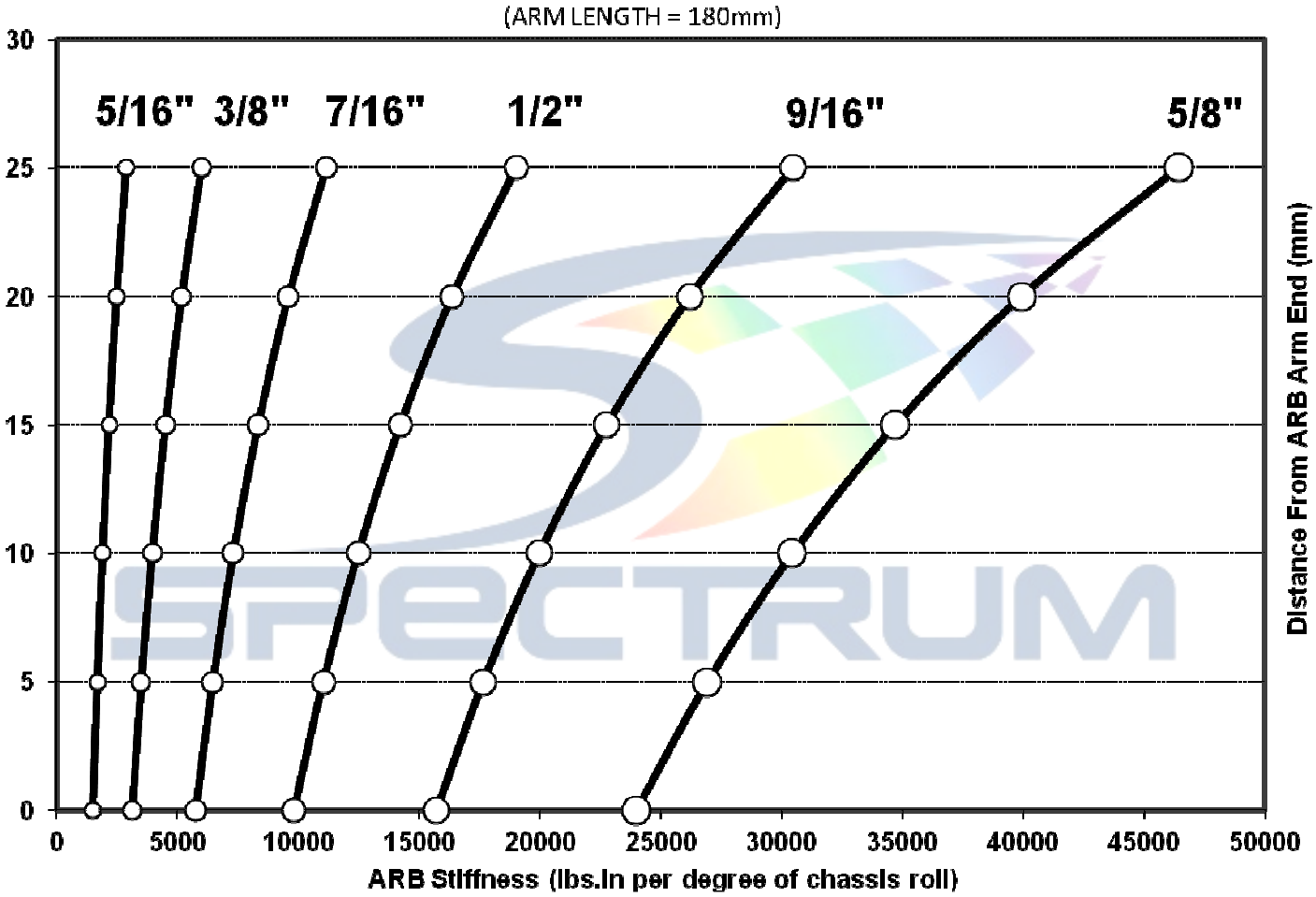
Adjusting Rear Pushrods only

Number of Flats	Rear Ride Height	Front Ride Height
0	40.0	40.0
1	40.1	40.7
2	40.3	41.4
3	40.4	42.1
4	40.6	42.8
5	40.7	43.5
6	40.9	44.2
7	41.0	44.9
8	41.2	45.6
9	41.3	46.3
10	41.5	47.0
11	41.6	47.7
12	41.8	48.4

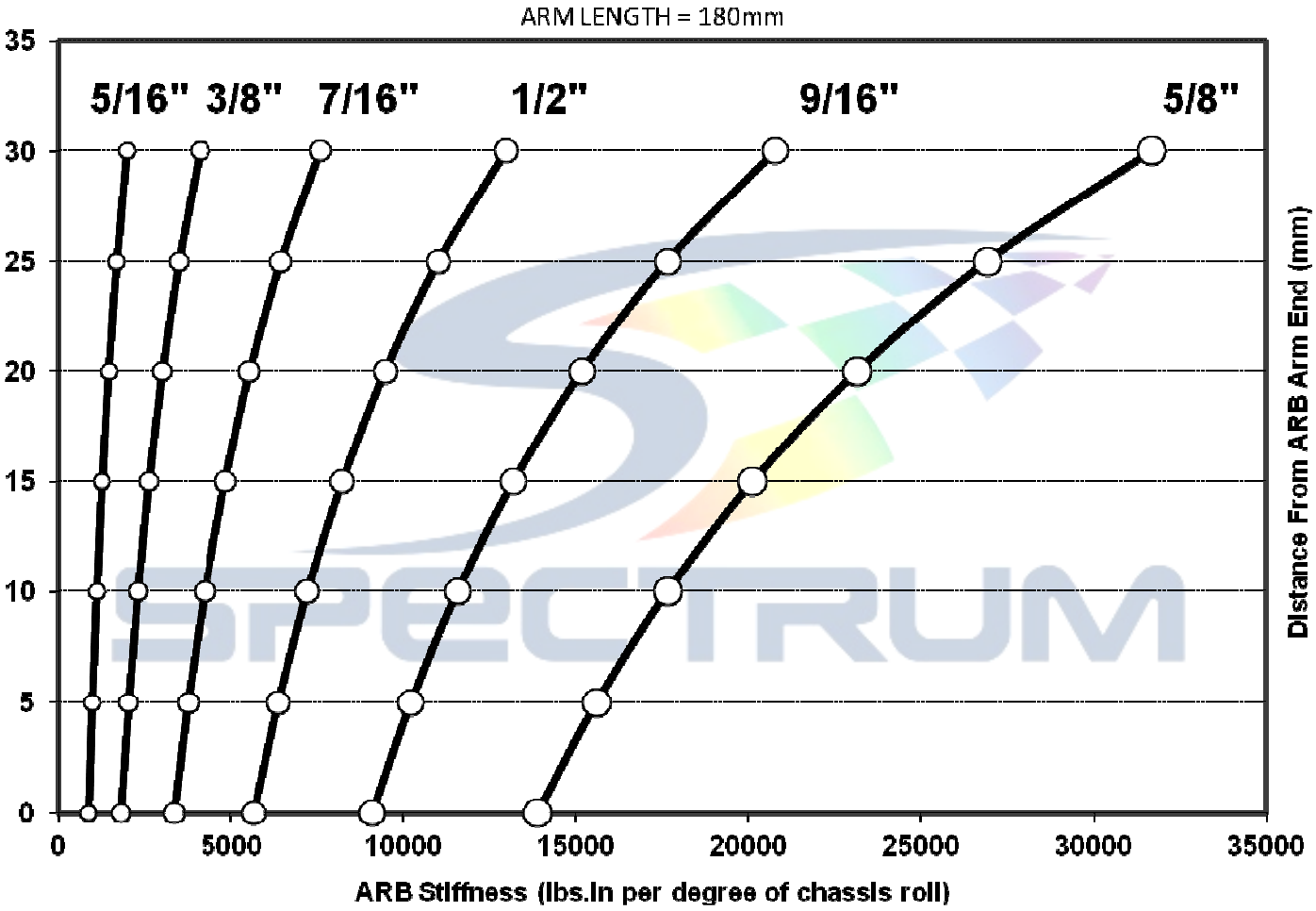
Adjusting Front Pushrods Only

Rear Height Reference: Machined Bottom of Bellhousing
Front Height Reference: Under Steering Bulkhead

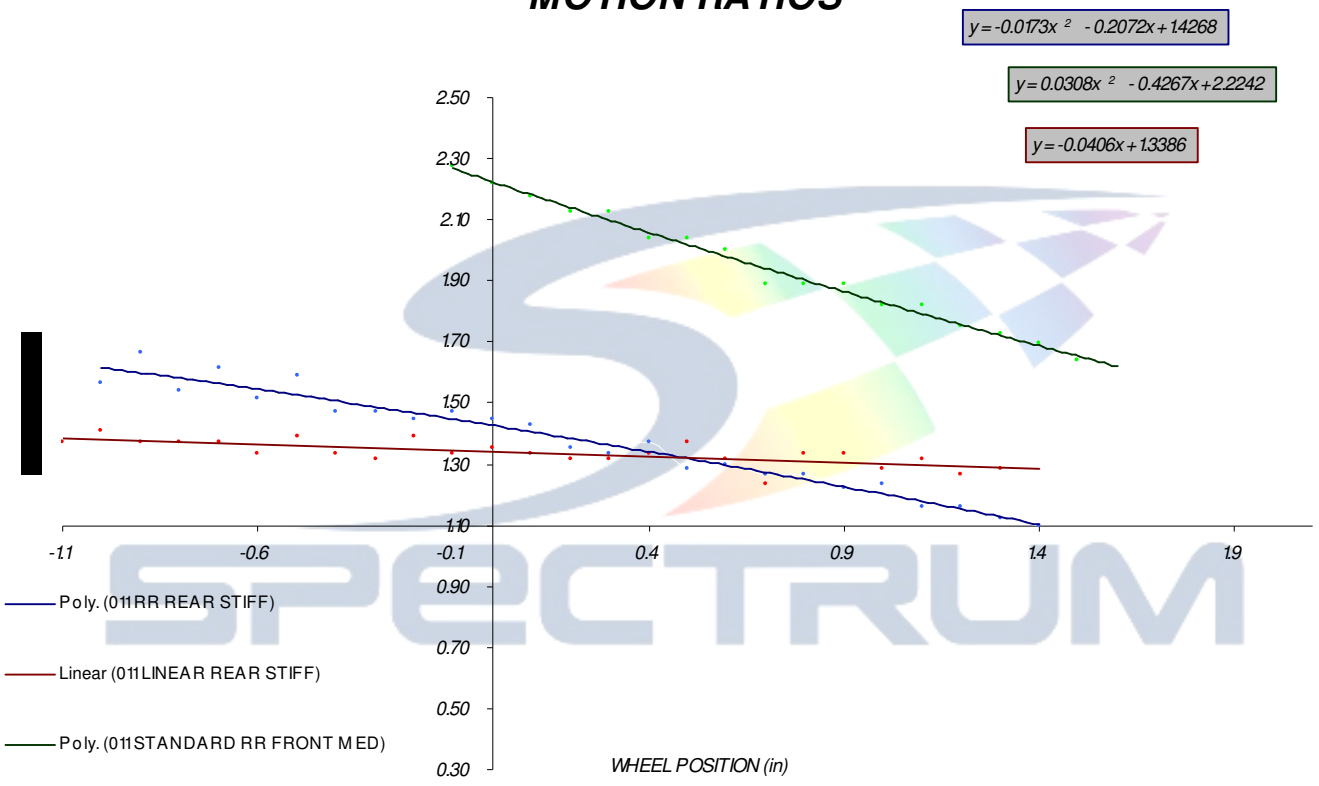
014 FRONT ANTI-ROLL BAR



014 REAR ANTI-ROLL BAR



MOTION RATIOS

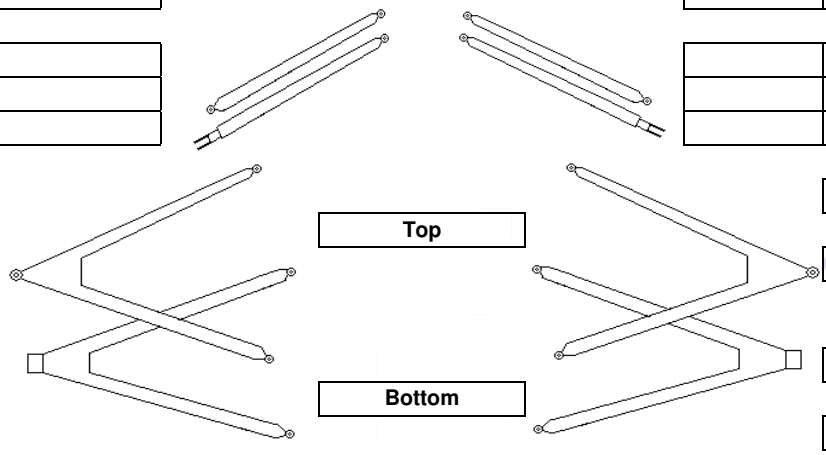


Spectrum Jig Sheet

Date	
Chassis	

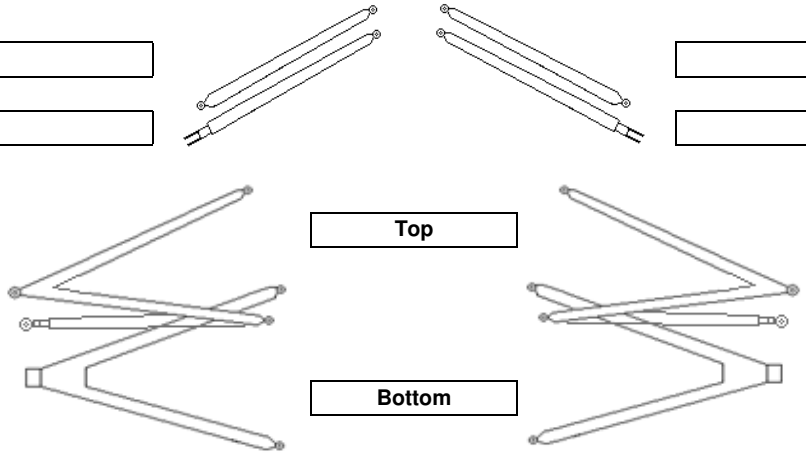
Front

Lower wishbone			Lower wishbone
Spacers			Spacers
Toe Link			Toe Link
Pushrod			Pushrod
For			For
Aft			Aft
For			For
Aft			Aft



Rear

Lower wishbone			Lower wishbone
Spacers			Spacers
Toe Link			Toe Link
Pushrod			Pushrod
For			For
Aft			Aft
For			For
Aft			Aft
Top rear leg spacer			Top rear leg spacer



13 ELECTRICAL FAULT FINDING

USA and Canada Only

No System Power

Test for 12v at master relay contact direct from battery, when master switch is on power should be available on both contacts, if not turn on and off master switch. You should hear the master relay turn on and off. If not, disconnect small plug, one side of connector will have 12 volts, and the other side of connector will have ground only when master switch is on. If this is correct replace the master relay. If not, go the rear master switch there will be 2 black wires these must have ground. When switched on, the yellow and white wires will contact to ground, one turning on the master relay, the other grounding the ignition relay.

No Ignition Power

Test for the following on the Bosch relay. Pin 85 must switch to ground when the master switch at the rear of car is on, this cut's out the engine when master cable is pulled. Pin 86 must have 12v when the ignition switch is in the on position. Pin 30 must have 12v constant when only the master switch is on. Pin 86 then supplies both of the large red standard Honda wiring loom connectors located at the right side of dash panel, both of these wires must have 12v for the engine management system to operate. For a quick test bridge together pins 86 and 30 on the relay plug this will bypass the system and power the ECU direct.

If this then brings the system alive,

#1 Check for continuity between pin 85 and ground

#2 Check for continuity between pin 86 and cold side of ignition

#3 Ensure 12v is available at the ignition switch, when the switch is in the on position 12v should be available at both sides of switch, if so replace Bosch relay.

No Fuel Pump

This system is quite simple, 12v is supplied from the ignition switch to fuel pump switch, and this is then switched directly to the fuel pump. Refer to Honda wiring for fuel pump connections.

14 BUILD & MAINTENANCE

The lower radiator pipe which runs from the left side of the engine to the RHS radiator needs to be in place before the engine is installed.

When bleeding brakes for the first time you will need to bleed the air out of the pressure sensor lines and bleed the brakes again after the first 3 sessions. It is normal for the pedal to feel slightly softer than usual for the first 2-3 days of use.