



MagneShock 3rd-Gen System
Oval-Track & Road-Race
COSTS Comparison

Conventional Adjustable SHOCKS				MagneShocks			
ONE-TIME costs:				ONE-TIME costs:			
Qty	each	Total		each	Total	each	Total
4	Adjustable Shocks on car	\$ 400	\$ 1,600	\$ 700	\$ 2,800	\$ 1,200	\$ 4,800
2	Spares (1 front, 1 rear)	\$ 400	\$ 800			\$ 2,875	\$ 2,875
4	Spares (1 extra set)			\$ 700	\$ 2,800	\$ 1,200	\$ 2,400
8	Spares & different valvings						
			\$ 2,400		\$ 5,600		\$ 10,075
OPTIONS:				OPTIONS:			
	Some shock-dyno testing and repairs		\$ 600				\$ 200
	Shock-Dyno	0		crude	\$ 1,000	accurate	\$ 20,000
	Rebuilding Kit & shock parts				\$ 200		\$ 20,000
	"Shock-MAN" (& associated costs)			part-time	\$ 5,000	full-time	\$ 100,000
	Rent track for testing	\$ -			\$ 1,000		\$ 3,000
	Tires & fuel used during testing	\$ 500			\$ 1,500		\$ 5,000
	Wear on racecar during testing	\$ 1,000			\$ 3,000		\$ 10,000
			\$ 2,100		\$ 11,700		\$ 158,000
1st Year costs:				1st Year costs:			
			\$ 4,500		\$ 17,300		\$ 181,000
	Subtract 1-TIME costs above		-0		-\$1,000		-20,000.00
YEARLY costs:				YEARLY costs:			
			\$ 4,500		\$ 16,300		\$ 161,000
							\$ 10,875
							-2,875.00
							\$ 8,000

TOTAL Yearly Costs		
Budget LOW-END racer	\$ 4,500	pretty well behind on everything - <u>very little</u> opportunity to keep up
MINIMUM serious racer	\$ 16,300	has fairly good equipment - <u>some opportunity</u> to keep up
PROFESSIONAL racer	\$ 161,000	has the best equipment - lots of <u>EXPENSIVE test time</u> to keep up
MagneShock racer	\$ 8,000	has <u>EVERYTHING he needs - ALWAYS</u> . No dyno or track renting required

YOU DECIDE - Where do YOU want to be?

On the other hand, You can BUY or RENT the Penske™ "Active Damper System". It does many, but certainly NOT ALL, of the things we offer on the MagneShock System. BUT, you will have to equip the car with a substantial 24v or 110v power supply to run it all. They will develop damping curves for you - average \$1000 per day (for a few curves). They will send a man with you to set it up & run it - Only \$1000 travel time, PLUS travel expenses, PLUS \$4000 per testing day. They say you should count on 2 days for curve development, 2 days for travel, 2 days for testing = \$11,000 plus travel expenses. If you decide to do this MORE THAN ONCE - "from time to time" - it may pay for you to consider BUYING the system. You can simply BUY the Penske system for only \$146,000.00 and they will include 2 days of training. See the their Attached sheets:

3000 SERIES ACTIVE DAMPER SYSTEM—DAILY RENTAL PRICING

The Penske Racing Shocks 3000 Series Active Damper System is occasionally available for rental for specific test sessions. A test session with this equipment would consist of the following:

- Development of the specific curves to be tested. The team's engineers provide the force curves that they want to test, and the Penske Shocks technical staff then calculates the exact settings which need to go into the 3000 in order to produce the desired curve. This development work is done one curve at a time, so the cost depends on how many curves are to be tested. The price for this curve development work is \$125 per hour. This development work is done at Penske Racing Shocks headquarters prior to traveling to the test. For planning purposes one should expect this portion of the test process to take between 1 and 2 days.
- Running on the test rig or on the race track. The **daily rate** for the 3000 Series Active Damper System and the Penske Shocks technician to operate it is **\$4,000 per day**, and assumes a maximum 10 hour day.
- One day of **travel in each direction** to and from the test is required and is billed at **\$500 per day**.
- **Weekends** – If any of the above steps are required to be done on a Saturday or a Sunday then a **50% surcharge** applies for that step.

For purposes of clarity, a test session would likely consist of 8 hours curve preparation \$1,000, one day of running \$4,000, and 2 days travel \$1,000 for a total of \$6,000. **Two days of curve preparation and two days of running, plus travel, would total \$11,000.**

For a test in the Charlotte area, hotel and related travel expenses will be borne by Penske Racing Shocks. For tests elsewhere or at race tracks, travel expenses may be the team's responsibility.

Advance reservations are essential for short term rentals, as equipment availability is very limited. In case of **cancellation** less than 10 days before a scheduled test session, a fee of **\$1,000 plus the cost of any curve development time completed**, will apply.

Customer is responsible for any Sales, Use, or other taxes which may be applicable. Customer is also responsible for damage to the equipment during testing.

Confidentiality: All setup data, customer shock curves, and test results will be kept confidential by Penske Racing Shocks. Any data on the Penske server will only be kept in password-secured files and will be deleted immediately upon the team's request. We take very seriously our obligation to not share a team's information with anyone.

The Competitive Advantage of Champions

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PENSKE

≡ RACING SHOCKS ≡
NEW PRODUCTS

AVAILABLE THROUGH
FACTORY ONLY

3000 SERIES ACTIVE DAMPER SYSTEM—GENERATION 1



The 3000 Series Active Damper System is a powerful tool intended for professional racing teams concerned with optimizing 7-post rig test sessions. Penske's latest tool in chassis development greatly reduces wasted rig time by allowing a single set of actively controlled dampers to quickly toggle between a wide range of damping curves. By eliminating shock changes and manual adjustments the 3000 Series Damper System can increase the number of rig runs completed in a day by over 60%. Changing the damping characteristic of all four corners takes only seconds, keeping the rig running at a constant pace and allowing for more complicated test matrices to be evaluated. This new approach to rig testing negates the need for numerous sets of rig dampers with varying configurations. The countless hours wasted preparing passive shock configurations for rig testing can now be re-directed toward more important development work, and shock inventories will no longer be divided between rig and track use.

The 3000 Series Damper system has been specifically designed to utilize the same key components as our popular 7300 series NASCAR damper. The main piston, head valve, and floating piston are common components, and the bore, reservoir, and shaft dimensions are identical to the 7300 series. Thus comparisons between passive and active shocks can be made with confidence, and technicians will be instantly familiar with the internal workings of the 3000 Series Active Damper. Also, because the active dampers are designed to behave like a 7300 damper, favorable active damping curves are more easily reproduced with passive race dampers.

In addition, the 3000 Series allows a team to evaluate damping curves which cannot be produced with current hardware or build techniques. The active system can be used to validate or disprove new ideas and theories before considerable time and resources are spent in development. Teams no longer need to wait weeks or months to try new ideas that may provide increased performance.

Penske Racing Shocks continues to improve the 3000 Series Damper System. A new upgradeable pricing structure allows for a gradual build up to (4) damper systems, minimizing startup investment. An Excel-based User Interface makes choosing a damping curve for each wheel fast and easy, while increased control points allow complete control of hysteresis and zero point settings, and an Auto-programming feature targets control points to match user specified damping curves. Additional enhancements planned for the future include position sensitive programming for De-coupled effect tuning, data logging, force based damper control, and Matlab interface development.

The 3000 Series System is an extremely useful tool for professional racing teams. While some of the most expensive shock measurement devices merely quantify how dampers behave, the 3000 Series Damper System provides a powerful means to optimize and develop damper behavior for increased car performance.

Benefits:

- Over a 60% Increase in rig runs for a given time period
- Fast, Effortless damper curve selection, (4) damper curve change time < 1 minute
- Dramatically reduced curve development time for rig testing
- One set of dampers needed for multiple days of rig testing
- Penske 7300 series internal components accurately mimic race damper characteristics
- Non-traditional damper curve shapes now possible for evaluation (regressive, etc.)

(cont'd on back)

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Main Office
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Details:

- Active Computer Control of Damper Characteristics
- Controlled Fluid Bypass of Main Piston
- Moog Hydraulic Components and Electronic Controls
- F-1 Moog Valve Technology
- Closed Loop Valve Position Control
- Linear Velocity Transducer for Optimal Sensor Performance
- **Wide Range of Damping Specifications Achievable with One Damper Set**
- Excellent Response and Passive Damper Coherence Upwards of 25 Hz
- All wiring harnesses shielded, stress relieved, and Raychem covered for durable connections
- All connectors are highest quality, Deutsche Autosport type.
- Standard Penske Damper Fluids, Pistons, Base Valves and Shims Utilized
- **Customer Specific Damper Length and Stroke Available – “Made to Order” System**
- C.O.T. Bump Stop Set-ups Possible
- **Standard 120V Power Supply or optional 24 Volt DC Source**
- Turn-key Control System (lap top not included)
- Customize-able Microsoft Excel Controller Interface
- Moog Digital Motion Controller Specifications
 - Advanced digital motion control for control (e.g. position, speed, force) of hydraulic and electric products.
 - Use of accepted standards and protocols insures fast implementation and easy set-up to save users time and money.
 - 32-bit RISC processor with Floating Point Unit for powerful, fast and accurate control.
 - Multiple software configurable interfaces: SSI, Encoder, CANopen, RS 232, Ethernet, Profibus, analog digital outputs and various serial interfaces.

Includes:

- 2 or 4 Complete Active Dampers with Velocity Transducers
- Custom Force Range setups for each damper at delivery
- All Wiring and Looms
- Digital Motion Controller – Moog M3000
- 1 Year Free Standard Control Programming Upgrades

- Copy of Moog MACS HMI Interface software
- 2 or 4 Remote Valve Control Electronics Boxes
- **2 Days of On-Site Training** and Commissioning of System by Penske Technician
- Full Penske Racing Shocks Technical Support (EST location)
- Full Moog Technical Support (EST location)
- Heavy-Duty Military-Grade Carrying Cases

Options:

- Additional Single Set-up Shock and Electronics Box (Laboratory Testing)
- Strain Gauge Eyelets
- 15mm or 1/2" monoballs
- Additional Wiring Looms

Pricing Options

Complete (4) Damper Control System: \$146,500

Upgrade-Ready (2) Damper Control System: \$98,750
(controller and programming capable of 4 damper control)

(2) Damper Upgrade Package: \$54,250
(includes everything needed to upgrade above system to 4 damper control)

Terms and Conditions: Delivery is 8 - 12 weeks from receipt of purchase order. 50% deposit with order, balance net 20 days after delivery. Shipped prepaid from Reading, PA with freight billed separately to customer. Customer is responsible for Sales, Use, and other applicable taxes.

****PATENT PENDING****