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# MORAN M.A.X.™ SERIES FUEL INJECTORS

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# MORAN M.A.X.™ SERIES FUEL INJECTORS (PAT. PEND.)

## 1. Introduction

Thank you for purchasing our new Moran M.A.X.™ series fuel injectors!

This instruction manual will help guide you through your experience using this product.

Enclosed is a summary of the instructions, service recommendations and disclaimer information. While we try to provide the most recent information, please contact our office for complete information and pricing.

It has been a long, hard road travelled to finally be able to provide professional racers with a reliable fuel injector for racing.



Mike Moran, President

## 2. Moran M.A.X.™ Injector Sizes

| SIZE                    | STATIC FLOW RATE | IMPEDANCE | RESISTANCE | BASE FUEL PRESSURE SETTING | NOZZLE STYLE   | SPRAY PATTERN                               |
|-------------------------|------------------|-----------|------------|----------------------------|----------------|---|
| 375 lbs/hr<br>MRE203751 | 375 lbs/hr       | LOW       | 1.8 Ohms   | 43.5 PSI                   | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |
| 500 lbs/hr<br>MRE205001 | 500 lbs/hr       | LOW       | 1.8 Ohms   | 90 PSI                     | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |
| 550 lbs/hr<br>MRE205501 | 550 lbs/hr       | LOW       | 1.8 Ohms   | 100 PSI                    | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |
| 800 lbs/hr<br>MRE208001 | 800 lbs/hr       | LOW       | 1.8 Ohms   | 90 PSI                     | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |
| 850 lbs/hr<br>MRE208501 | 850 lbs/hr       | LOW       | 1.8 Ohms   | 100 PSI                    | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |
| 900 lb/hr<br>MRE209001  | 900 lbs/hr       | LOW       | 1.8 Ohms   | 110 PSI                    | Spherical Disc | Large Fog with 45-degree Vapor Cone Pattern |

## 2.1 Injector Electrical Specifications and ECU Information

For our injectors to run with your EFI system, they require dedicated drivers that are 4-amp peak & 1-amp hold or 8-amp peak and 2-amp hold (recommended). If you have any questions regarding your EFI system, please contact your manufacturer direct to ensure these requirements are met.

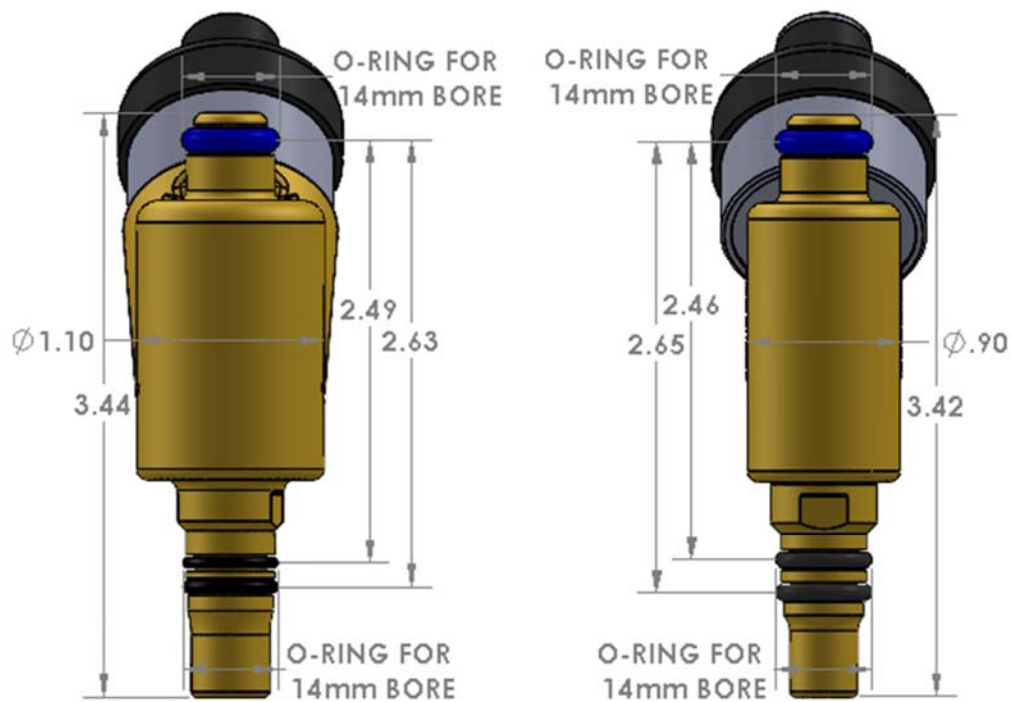
|                                       |                         |
|---------------------------------------|-------------------------|
| <b>Operational Voltage</b>            | 12v – 24v               |
| <b>Coil Resistance</b>                | 1.8 Ohms                |
| <b>Impedance</b>                      | Low Impedance           |
| <b>Driver Circuit</b>                 | 4-Amp Peak, 1-Amp Hold, |
| <b>Driver Circuit<br/>(Preferred)</b> | 8 Amp Peak, 2 Amp Hold  |

**ECU:** Moran M.A.X.™ injectors are compatible with most aftermarket EFI systems.

**Injector Drivers:** The low impedance coils in the fuel injectors will operate with 4-amp peak & 1-amp hold drivers, but Moran Racing Engines recommends 8-amp peak & 2-amp hold injector drivers for peak performance.

**Voltage:** The fuel injectors will operate in a voltage range between 12-24 volts; Moran Racing Engines recommends operating at 16 volts.

## 2.2 Injector Dimensions



MORAN M.A.X.™ 850  
DIMENSIONS

MORAN M.A.X.™ 550  
DIMENSIONS

## 2.3 Injector Battery Offset Table (Deadtimes)

### 850 lbs/hr Battery Offset Table

Fuel Pressure (PSI)

| Battery Voltage | 43.5 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100.0 | 110.0 | 120.0 | 130.0 |
|-----------------|------|------|------|------|------|------|-------|-------|-------|-------|
| 20              | 0.00 | 0.00 | 0.02 | 0.06 | 0.10 | 0.12 | 0.14  | 0.18  | 0.22  | 0.22  |
| 19              | 0.06 | 0.06 | 0.08 | 0.12 | 0.13 | 0.20 | 0.24  | 0.26  | 0.28  | 0.48  |
| 18              | 0.16 | 0.16 | 0.18 | 0.20 | 0.22 | 0.34 | 0.38  | 0.38  | 0.48  | 0.54  |
| 17              | 0.24 | 0.26 | 0.28 | 0.28 | 0.32 | 0.48 | 0.48  | 0.56  | 0.56  | 0.76  |
| 16              | 0.40 | 0.40 | 0.44 | 0.46 | 0.50 | 0.64 | 0.68  | 0.68  | 0.72  | 0.88  |
| 15              | 0.48 | 0.48 | 0.60 | 0.60 | 0.64 | 0.80 | 0.84  | 0.84  | 0.92  | 1.00  |
| 14              | 0.60 | 0.68 | 0.72 | 0.72 | 0.74 | 0.92 | 1.08  | 1.04  | 1.12  | 1.22  |
| 13              | 0.76 | 0.80 | 0.88 | 0.90 | 0.98 | 1.24 | 1.32  | 1.34  | 1.40  | 1.60  |
| 12              | 0.92 | 0.96 | 1.08 | 1.18 | 1.20 | 1.48 | 1.56  | 1.62  | 1.76  | 2.22  |
| 11              | 1.20 | 1.24 | 1.36 | 1.48 | 1.80 | 1.80 | 2.04  | 2.08  | 2.74  | N/A   |
| 10              | 1.46 | 1.52 | 1.66 | 1.74 | 1.84 | 1.84 | 2.44  | N/A   | N/A   | N/A   |
| 9               | 1.84 | 1.84 | 2.08 | 2.44 | 3.12 | N/A  | N/A   | N/A   | N/A   | N/A   |

### 550 lbs/hr Battery Offset Table

Fuel Pressure (PSI)

| Battery Voltage | 43.5 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100.0 | 110.0 | 120.0 | 130.0 |
|-----------------|------|------|------|------|------|------|-------|-------|-------|-------|
| 20              | 0.00 | 0.02 | 0.04 | 0.06 | 0.06 | 0.10 | 0.12  | 0.14  | 0.14  | 0.14  |
| 19              | 0.00 | 0.02 | 0.08 | 0.10 | 0.12 | 0.14 | 0.22  | 0.24  | 0.26  | 0.30  |
| 18              | 0.10 | 0.14 | 0.22 | 0.22 | 0.24 | 0.26 | 0.30  | 0.34  | 0.46  | 0.54  |
| 17              | 0.18 | 0.20 | 0.34 | 0.36 | 0.42 | 0.42 | 0.46  | 0.50  | 0.54  | 0.66  |
| 16              | 0.22 | 0.26 | 0.46 | 0.48 | 0.50 | 0.54 | 0.58  | 0.66  | 0.70  | 0.74  |
| 15              | 0.36 | 0.38 | 0.48 | 0.50 | 0.54 | 0.74 | 0.76  | 0.78  | 0.80  | 0.86  |
| 14              | 0.58 | 0.66 | 0.74 | 0.76 | 0.80 | 0.90 | 0.92  | 1.02  | 1.06  | 1.06  |
| 13              | 0.70 | 0.76 | 0.88 | 0.90 | 1.00 | 1.06 | 1.10  | 1.24  | 1.28  | 1.34  |
| 12              | 0.84 | 0.86 | 0.98 | 1.12 | 1.16 | 1.20 | 1.34  | 1.36  | 1.42  | 1.50  |
| 11              | 0.88 | 0.90 | 1.00 | 1.24 | 1.44 | 1.48 | 1.54  | 1.58  | 1.78  | 1.94  |
| 10              | 1.18 | 1.38 | 1.78 | 1.74 | 1.92 | 2.04 | 2.10  | 2.38  | 2.54  | 2.62  |
| 9               | 1.68 | 1.88 | 1.94 | 2.24 | 2.30 | 2.42 | 2.82  | 3.18  | 3.46  | 3.66  |

### 3. Installation

Prior to installing our M.A.X.™ Series fuel injectors, verify your entire fuel system is free of debris. Thoroughly clean all fuel lines, fuel rails & fittings. Any debris left in the fuel system may damage our fuel injectors.

To install the injectors, lube the top and bottom o-rings with provided Super Lube Synthetic Grease. Insert the top of the injector into the fuel rail making sure the top o-ring is fully seated inside the rail. Align installed fuel injectors with the intake manifold bungs and press down until all injectors are fully seated.

It is **critical** to pressurize your fuel system to check for leaks and to verify all o-rings are free from damage prior to starting the engine.

The dirtiest your fuel system will ever be is when it's first assembled. There is debris and residue adhering from storage and assembly. Assembly of new fuel lines, new fuel pumps and filters will leave debris that can damage the internal components of the fuel injectors. It is recommended for a new fuel system to be flushed before initial startup. In addition, you may run OEM style fuel injectors at idle to clear any contaminants out of the fuel system before running Moran M.A.X.™ fuel injectors.

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### 4. Fuel System Requirements

#### 4.1 Fuel

Moran M.A.X.™ fuel injectors are designed to be compatible with multiple fuels including:

- Methanol
- Gasoline
- Ethanol
- Nitromethane

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#### 4.2 Fuel Pressure

Moran M.A.X.™ Series Fuel Injectors have a maximum base fuel pressure. See the Injector Size Table in Section (2) of this guide for the maximum base fuel pressure settings.

**Base Pressure:** See the Injector Size Table in Section (2) of this guide. The increase in fuel pressure allows for a more complete atomization of the fuel.

**Fuel Rail:** To reduce fuel pressure pulsation and drops in pressure inside of the fuel rail, Moran Racing Engines recommends using our Moran M.A.X.™ Bore fuel rail, part number MRE201602 (AN-16).

#### Example Fuel Pressure calculation:

100 PSI base fuel pressure + 50 PSI of boost = 150 PSI of fuel pressure.

| Base Fuel Pressure |   | Boost  |   | Total   |
|--------------------|---|--------|---|---------|
| 100 PSI            | + | 50 PSI | = | 150 PSI |

### 4.3 Fuel Filtration Information

Filter – Moran Racing Engines requires the use of a 10-micron filter with our Moran M.A.X.™ Series Fuel Injectors. You must run a 10-micron filter between the injectors and the fuel pump. Please contact this office for a recommendation on the proper fuel pump & fuel filter setups for your specific application.

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## 5. Service & Maintenance

### 5.1 Flow Testing

The only fluids that should be used to flow test your injectors is heptane, gasoline or methanol. Using any other fluids may damage the fuel injectors.

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### 5.2 Injector Maintenance

**Before Using Injectors:** See Installation, Section 3 – verify your system is free of debris, lube your injector o-rings, pressurize your fuel system

**After Using Injectors:** Moran M.A.X.™ Injectors work best when top lube is present in the methanol. After use, the injectors must be purged of all methanol and then lubricated. *Failure to purge methanol from the injectors after use WILL damage the injectors and/or hinder flow.*

**Maintenance:** In addition to doing the maintenance procedures listed above, we recommend sending the injectors back once annually for flow testing and inspection.

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### 5.3 Shipping Injectors

Shipping costs to and/or from Moran Motorsports is at the customer's expense. When shipping, use care in packing, ship it prepaid and adequately insured against loss or theft. In our area, we recommend UPS. Include a letter detailing your information and provide a daytime phone number where you can be reached and email address, if available.

**SHIP TO:**  
**Moran Motorsports, Inc.**  
**Injector Service**  
**12351 Universal Dr.**  
**Taylor, MI 48180**  
**(734) 947-1234**

| SERVICE  | FEES     |
|--|----------|
| INJECTOR EVALUATION – Injectors sent in by the customer for evaluation | \$150.00 |
| INJECTOR FLOW TEST – flow test, flow to specs                          | \$150.00 |

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## 6. Terms & Conditions

### 6.1 Manufacturer Disclaimer

Disclaimer of Warranty - Moran Motorsports, Inc. makes no warranties either expressed or implied, including any warranty of merchantability of or fitness for a particular purpose. There is no warranty expressed or implied as to whether the goods sold hereby will protect purchaser or ultimate user of such goods from injury or death. Racing is a dangerous activity and the user shall determine the suitability and safety of the product for its intended use, and the user assumes all responsibility and risk in connection there within. The purchaser is responsible for determining the suitability of any and all products purchased from Moran Motorsports, Inc. There is no warranty stated or implied due to the unusual stresses placed on race cars and components; we have no control over how they are installed, maintained and used. Due to the hazards involved with racing, Moran Motorsports, Inc. accepts no liability for failures of racing components or accessories manufactured or sold by Moran Motorsports, Inc. or any of its Distributors. Upon purchasing this product(s), customers accept all risks involved with racing and hazards thereof.

1. **ASSUMPTION OF RISK** - Our products are designed and manufactured to be used for off road use only. Purchasers/users of our product assumes all risk and that the proper precautions are in place at all times for the safety of the user of our products and other persons (without limitation, spectators, course workers, etc.)

2. **FULL AND FINAL RELEASE AND WAIVER OF LIABILITY AND ALL CLAIMS** - Vehicle racing is an inherently dangerous sport with significant risk of personal injury and death. Purchasers and/or users of our products agree to waive and fully release any owner, officer, employee or agent of Moran Motorsports Inc., or any subsidiaries, from any and all liability for any loss, damage, injury or expense that the purchaser and/or user may suffer as a result of the use of our product(s) due to any cause whatsoever. This includes negligence, gross negligence, breach of contract or breach of any statutory or other duty of care.

3. **AGREEMENT TO INDEMNIFY, TO SAVE AND HOLD HARMLESS** - Purchaser and/or end user agrees to indemnify and to save and to hold harmless any owner, officer, employer or agent of Moran Motorsports Inc., or any subsidiary, from any litigation expense, legal fees, liability, damage, award or cost, of any form or type whatsoever, they may incur due to any claim made against them or any one of them by purchaser and/or end user, or purchaser and/or end users estate. Whether the claim is based on the negligence or the gross negligence of purchaser and/or end user, or otherwise as stated above.

4. **PROPER USE OF PRODUCTS** - Purchaser and/or end user are solely responsible that the intended and actual use of any product is made in compliance with any manuals provided with product or other information provided by Moran Motorsports Inc., or any subsidiary, in writing and which specifically references the product. Purchaser and/or end user may not rely on any oral information or statements provided by Moran Motorsports Inc., or any subsidiary, or in any forum or other source of information regarding the products. It is the purchaser and/or the end users' responsibility to inspect and verify dimensions, specifications and performance of the products as being appropriate for the use to which the user will put them prior to any actual installation and/or use. The products are to be inspected by the purchaser and/or end user before each use before for evidence of damage, defect or wear. The installation of the products may adversely affect other vehicle components, safety equipment, or manufactured goods (collectively "goods"). Moran Motorsports Inc., or any subsidiary, assumes NO



RESPONSIBILITY for any damage to other goods or bodily injury that may arise due to failure of other goods, due to installation, and/or use, either proper or improper, of its products.

PRODUCTS (INCLUDING PRODUCTS RESOLD BY Moran Motorsports Inc., or any subsidiary) ARE SOLD "AS IS", WITHOUT ANY WARRANTY, WRITTEN OR ORAL, WHATSOEVER. EXPRESSED WARRANTIES, IMPLIED WARRANTIES, WARRANTIES OF MERCHANTABILITY AND WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. THE ENTIRE RISKS OF QUALITY AND PERFORMANCE OF THE PRODUCTS IS WITH THE BUYER, USER, SUBSEQUENT USER, OR AGENT THEREOF (HEREIN "USER"). SHOULD THE PRODUCTS PROVE DEFECTIVE FOLLOWING THEIR PURCHASE, THE BUYER AND NOT Moran Motorsports, Inc., or any subsidiary, ANY DISTRIBUTOR(S), OR RETAILER(S), ASSUME THE ENTIRE COST OF ALL NECESSARY SERVICES OR REPAIR AS A RESULT OF A PRODUCT FAILING.

**\*\*ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE\*\***

**ALL SALES ARE FINAL**

Pricing / Printing Errors

Errors in typographical content, pricing and photography are subject to correction and may change without notice. Prices are subject to change at any time without notice.

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## 7. Warnings

### 7.1 Racing Use (Off-Road) Only

Moran Motorsports Inc. fuel injectors are intended for racing (off-road vehicle) use only.

This part is legal for sale and use on Racing Use Only Vehicles.

The following vehicles are considered Racing Use Only Vehicles:

- Racing Use Only Vehicles are vehicles that are used exclusively for competition and that are not registered and that may never be used on the street

**WARNING: It is against the law to install this part on an Emissions Controlled Vehicle**

The following vehicles are considered Emissions Controlled Vehicles:

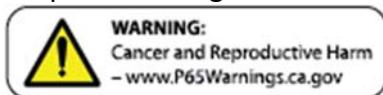
- 1966 and newer U.S. manufactured California Certified vehicles
- 1968 and newer U.S. manufactured Federally Certified vehicles
- 1968 and newer Foreign manufactured vehicle

Failure to follow these instructions and common sense when using Moran M.A.X.™ Series Injectors may cause damage to the injectors and your engine. Moran Motorsports, Inc. is not liable for damage. Failure to follow these instructions, including the use of the recommended filter may result in damage. Please see the Manufacturer Disclaimer section for more information.

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### 7.2 Prop 65

Prop 65 Warning – Hazardous Materials Warning



**WARNING: Cancer and Reproductive Harm** For more information, visit [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

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## 8. Contact Information

Moran Motorsports, Inc.

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Sales@moranmotorsports.com

If you have any questions, please feel free to contact us or visit our website at

[www.moranmotorsports.com](http://www.moranmotorsports.com).

Moran M.A.X.™ Series Injectors are proudly ENGINEERED & MADE IN THE USA

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