

# ***Your Global Partner in Precision Products***

**Fuel Systems**



**Precision Manufacturing**



**Fuel Filtration**



**Fuel Additives**

**STANADYNE®**

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

**Stanadyne Corporation**

Stanadyne dates back to 1876, when the company then known as Hartford Machine Screw Company was formed. In 1952, Stanadyne entered and revolutionized the Diesel Fuel Injection market with the introduction of the first rotary distributor type diesel fuel injection pump. Today, Stanadyne is known around the world as a leading supplier of diesel fuel systems and components. In addition, Stanadyne is quickly becoming an industry leader in the fast growing field of Gasoline Direct Injection (GDI). Our products are for engine applications in agriculture, construction, power generation, industrial, marine, and on-highway vehicles. Over the years Stanadyne has expanded and today we are truly global with precision manufacturing locations in China, India, Italy, and the United States. We have been providing innovative fuel system solutions to our customers for over 50 years and continue to focus on developing future cutting edge fuel systems, that will help distinguish our customers' engines from their competition.

**Worldwide Service**

Stanadyne's worldwide service network of approximately 1000 authorized service agencies has the dedication, training, technical competence and factory original parts and units to provide timely, high quality service support during the Stanadyne warranty period and throughout the service life of the engine. Locations of Stanadyne's authorized service agencies can be found in the dealer locator section of our website ([www.stanadyne.com](http://www.stanadyne.com)).

**NEXT GENERATION DIESEL COMMON RAIL SYSTEM**

Stanadyne's Diesel Common Rail Supply Pumps and Injectors are aimed at the next generation of light to medium duty diesel engines. Their compact size, high pressure capabilities, and ultra fast response times set them apart from the competition. Since many engine manufacturers prefer installing complete systems, Stanadyne is now developing a complete Common Rail System including the supply pump, injectors, rail(s) and electronic controls.

**Common Rail Supply Pump****Features & Benefits:**

- 2300<sup>+</sup> bar pressure rating
- Designed for 2.0 to 7.0<sup>+</sup> liter diesel engines
- Inlet metered (inlet temperature range: -40°C to 100°C)
- Robust eccentric roller pumping mechanism
- RME & low lubricity fuel compatible
- Very high efficiency
- Low hydraulic & acoustical noise
- Compact, simple installation
- Easily adaptable to a wide range of engine configurations

**Options:**

- Fuel temperature sensor
- Internal transfer pump
- High pressure control valve (solenoid or mechanical)

**Common Rail Injector Features & Benefits:**

- 2300<sup>+</sup> bar pressure rating
- High efficiency (low back leakage)
- Low moving mass for:
  - high speed precise control
  - use of low current actuator
- Capable of multiple & close coupled pilot & post injections
- Easily adaptable to a wide range of engine configurations down to 17 mm diameter

## DIESEL FUEL INJECTION PUMPS

Stanadyne's diesel fuel injection pumps enable engine manufacturers in achieving Tier 3/Stage III A Emissions and beyond.

### MODEL DB2 & DB4

The majority of engines fitted to off-road applications continue to use mechanical pump-line-nozzle systems for Tier 3/Stage III A Emission certified engines.

#### FEATURES

- Capacities to 40 BHP (30 kW) per cylinder
- Peak injection pressure to 850 bar (12,000 PSI)
- 2, 3, 4, 5, 6 and 8 cylinder versions
- Mechanical Governing to 3% regulation "Best in Class"
- Built-in Automatic Advance
- Electric Shut-off
- Engine speeds to 5,000 ERPM

#### SELECTED OPTIONS

- Speed/Light Load Advance for optimized timing\*
- Cold start and warm-up Timing Advance\*
- Adjustable speed regulation (3-5%)
- Electronic Governor (Isochronous)
- Low Speed Fuel Limiter (smoke and emissions reduction)\*
- Locked Drive Shaft Timing\*
- Components for low viscosity fuel usage

*\* Key features for Tier 3/Stage III A Emission certified engines*



### MODEL DE ELECTRONICALLY CONTROLLED PUMP

Stanadyne's DE Electronically Controlled Fuel Injection Pump has been in production since 2002 and has proven to be a reliable and cost effective fuel pump. Stanadyne has developed a new pilot injection control strategy to assist the engine manufacturer in achieving Tier 3/Stage III A Emissions.



#### FEATURES

- Capacities to 40 BHP (30 kW) per cylinder
- Peak injection pressures to 1000 bar (14,500 PSI)
- 3, 4 and 6 cylinder versions
- Electronic spill control with single 12-volt solenoid actuator for timing and fuel control
- Two pumping plungers driven by internal cam ring
- Angle-based control strategy
- Engine speeds to 3600 RPM

#### OPTIONS

- Pump mounted solenoid driver with valve closure detection
- Complete flexibility of fuel metering and injection timing
- Complete governing flexibility with enhanced idle speed control
- Pilot injection

### MODEL DS ELECTRONIC PUMP



#### FEATURES

- Capacities to 30 BHP (22.5 kW) per cylinder
- Peak injection pressure to 800 bar (11,600 PSI)
- 4, 6 and 8 cylinder versions
- Electronic spill control with single 12-volt solenoid actuator for timing and fuel control
- Four pumping plungers driven by internal cam ring
- Pump mounted solenoid driver with valve closure detection

- High resolution pump mounted angular encoder
- Engine speeds to 5000 RPM
- Complete flexibility of fuel metering and injection timing control
- Complete governing flexibility with enhanced idle speed control
- Angle-based control strategy

## INTEGRATED FUEL SYSTEM

Stanadyne's Integrated Fuel System contains an integrated unit pump and injector with a roller cam follower. The unit pump is capable of pressures up to 1200 bar with a maximum fuel delivery of 100mm<sup>3</sup>/stroke at 3600 engine rpm. The injector is our Compact Pencil Nozzle (CPN) that operates at pressures up to 875 bar.

#### FEATURES

- 1200 bar pressure
- 100mm<sup>3</sup>/injection fuel delivery
- 12 engine degrees light load advance
- Optional cold advance: 10 engine degrees
- Optional speed advance: 10 engine degrees
- Rated speeds up to 3600 engine RPM
- Maximum over speed: 4000 engine RPM
- -40 to 125°C operating temperature



## "PF" TYPE PUMPS

Stanadyne offers a quality line of Submerged type diesel fuel injection pumps for small diesel engines in one, two and three cylinder configurations. The pumps are available in K, Q, and QLC type versions for applications from 5 to 15 hp (3.7 to 11 kW) per cylinder.



### INJECTORS AND NOZZLE ASSEMBLIES

Stanadyne offers a wide variety of injectors and nozzle assemblies for both direct and indirect injection diesels. Sizes available are 9.5mm, 17mm and 21mm in both hole type and pintle designs.

#### RSN® INJECTORS

The Stanadyne Rate Shaping Nozzle is a unique approach to providing fuel injection rate shaping for direct injection engines. In contrast to two stage injectors and other more costly methods that have been used for this purpose, the RSN® injector offers a greatly simplified and more compact alternative.

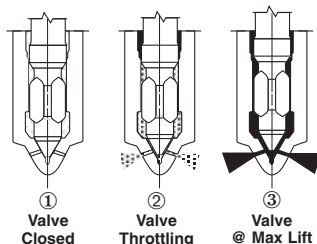
The RSN® accomplishes the fuel flow throttling necessary for injection rate control by hydraulic regulation of a throttling area preceding the spray holes. This eliminates the need for two springs and associated hardware without affecting injector size or capability.

Evaluations performed have shown that engine performance with RSN® injectors can be equivalent to that with more complex two spring injectors. An application optimization program is necessary to achieve maximum engine benefit.

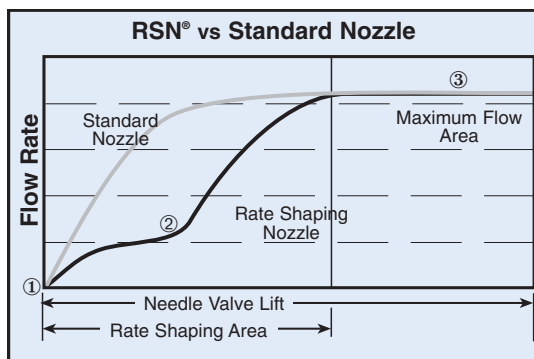
Features:

- Available in 17, 21, 17/21mm and Pencil Nozzle® design envelopes
- Physically interchangeable with existing 1 & 2 spring injectors
- VCO nozzle configuration
- 1800 bar maximum injection pressure capability (17/21mm injector)
- 1050 bar maximum injection pressure capability (Pencil Nozzle®)
- Lower valve guide for even flow distribution to spray holes at low valve lift (17mm & 21mm only)

#### RSN® OPERATION



17mm RSN® Injector



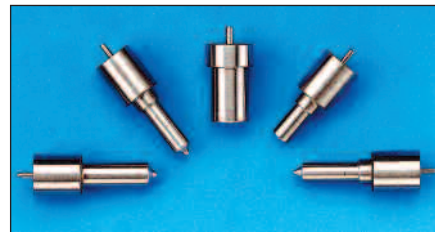
#### 17mm & 21mm FUEL INJECTOR ASSEMBLIES



Stanadyne 17/21mm Fuel Injector assemblies are available in a wide range of sizes and configurations. See below:

Size:	17mm	17/21mm	21mm
Holder Designs:	Bar Stock	Bar Stock	Bar Stock Forging
Engine Mounting Types:	Clamp Screw Screw-in	Clamp Screw Screw-in	Flange Clamp Screw Screw-in
Nozzle Types:	Hole Pintle	Hole Pintle	Hole Pintle
Nozzle Sizes:	M, P	M, P	M, P, S

#### HOLE AND PINTLE TYPE NOZZLE ASSEMBLIES



A large selection of nozzle assemblies are available to OEM engine designers to meet their specific applicational requirements. Nozzle design, spray patterns and flow requirements are closely coordinated with the engine manufacturer to assure needed performance requirements. Basic size and type configurations are shown below:

	HOLE TYPE	PINTLE TYPE
Size:	21mm (S) 17mm (M) & (P)	21mm (S) 17mm (M)
Sac Volume: (mm)	(M) from 0(VCO) to 0.77 (P) from 0(VCO) to 0.85 (S) Various	N/A
Shank Diameter: (mm)	9.2 (S) 7.2 & 9.2 (M, P)	7.2 (M) 13.9 (S)
Valve Guide Size: (mm)	5 & 6 (S) 4.5 (M) 4.0 (P)	5 & 6 (S) 4.5 (M)

## PENCIL NOZZLE®



Since 1967, diesel engine manufacturers around the world have used Stanadyne's revolutionary Pencil Nozzle®. Its compact size continues to provide the design flexibility that engine manufacturers require to assist in meeting increasingly stringent emissions standards. After 40 years, new variations of this groundbreaking design continue to be introduced into production.

### Features & Capabilities:

- 9.5mm holder body diameter
- Nozzle shank diameters as small as 5.4 mm
- Rated for applications with peak injection pressures up to 1050 bar
- Opening pressures to 280 bar
- Low sac volume configurations
- Clamp style mounting
- Leak-off and No Leak-off versions
- Orifice conditioning for atomization optimization and tighter flow band tolerancing
- Injection Rate Shaping (RSN) feature available

## DIESEL AFTERTREATMENT INJECTOR Urea SCR and Hydrocarbon Dosing

Stanadyne is now offering its aftertreatment injector designed for use in both urea SCR and hydrocarbon injection systems. Designed specifically for the harsh environment of a diesel exhaust system, the injector features high levels of thermal isolation and precise fluid metering. The critical levels of atomization are achieved without the need or cost of high injection pressures.

### Features & Benefits:

- Atomizes to 50 micron SMD (Sauder mean diameter)
- Operates down to 5 bar pressure
- Compact, robust design for ease in packaging
- Designed to withstand 800°C exhaust gases
- Pulse-width modulated for wide range of fuel delivery



## GASOLINE DIRECT INJECTION (GDI) SUPPLY PUMPS



Stanadyne has developed high-pressure gasoline supply pumps for homogeneous and stratified direct injection engines. These 200-bar capable demand control pumps are available in one and three piston configurations, with delivery capacities up to 1,400 mm³ per pump revolution. They are suitable for use in gasoline/alcohol blend fuels such as E10, E22 and E85.

The three-piston pump is currently supplied to Mercedes Benz for the M272 direct injection V6 engine. The single-piston pump is in development for applications in Europe, Asia and North America.



3 Piston Demand Control Pump



1 Piston Demand Control Pump

### DIESEL FUEL FILTERS & WATER SEPARATORS



### FUEL MANAGER SERIES

Fuel Manager® is a unique, patented, modular diesel fuel filter/water separator system that can be customized for virtually any application.

There are three Fuel Manager Systems available:

- FM 10 Series for diesel engines from about 10 to 200 HP, with a maximum fuel flow rate 60 U.S. gals./hr. (230 LPH).
- FM 100 Series for diesel engines up to about 350 HP, (80 U.S. gals./hr. or 300 LPH).
- FM 1000 Series for diesel engines from about 250 to 600 HP, with flow rates up to 180 U.S. gals./hr. (680 LPH).

Higher flow rates can be accommodated by installing units in parallel.

Fuel Manager is designed for use in truck, automotive, heavy equipment, marine, industrial and agricultural diesels. The completely modular system has interchangeable components that can be added or removed easily and independently. All Fuel Manager units remove both particulates and water, and can be adapted for a variety of applications. Optional modular features can be added by the manufacturer, dealer, and in most cases the user. These optional modules include see-through water collection bowl; 12V or 24V electronic water-in-fuel sensor; 12V or 24V electric heaters; diverter heater, which uses return fuel to prevent waxing; hand priming pump; electric priming pump; electric lift or transfer pumps; automatic air purging; filter change indicators, etc.

Filter elements for the Fuel Manager Series are available in five different micron ratings:

- 150 micron coalescing pre-filter/water separator
- 30 micron "primary" or pre-filter/water separator
- 10 micron "primary" or pre-filter/water separator



- 5 micron "secondary" or final filter/water separator
- 2 micron "secondary" or final filter/water separator

Each employ Stanadyne's unique filtration process, trapping more impurities and water without impeding the flow rate. The product's design permits the replacement of elements **without the use of tools and without spilling fuel**, making service easy in the shop or in the field. When an element is replaced, an easily opened drain valve allows the filter to be completely and neatly emptied before it is removed.



### OPTIONAL FEATURES

A selection of modular options allows the system to be easily customized:

- An in-unit heater is available to assist in cold weather operating environments. A simple and reliable thermostat sensor reacts to the fuel temperature and activates a high-efficiency heating element in the filter. Melting waxy crystals within the fuel filter improves winter starting performance.
- An electronic "water-in-fuel" indicator can easily be connected from the element's sump to a remote alert light.
- A see-thru engineered plastic bowl is available and allows convenient visual inspection of water residue levels.
- A hand primer quickly purges air from the fuel system after an element change.
- An electric lift pump that draws fuel from the fuel tank - ensuring a regular and constant low pressure fuel supply to the system.
- A filter change indicator to alert the user when it is time to change the filter element.
- Special marine components are also available with extra anticorrosion protection.

The Fuel Manager's specially designed mounting header accepts any combination of these options. The Series also is available in "top-load" models, which make all serviceable parts accessible from above, providing greater flexibility in design for the OEM by reducing the need for surrounding work space.

Today, over 60 OEMs specify Stanadyne's Fuel Manager fuel filter/water separator systems for their engines and /or equipment. In addition, hundreds of other manufacturers, who use diesel engines made by John Deere, Caterpillar, Perkins, Sisu, Case, New Holland, Ford, and others are benefiting from the superior performance, flexibility, ease of use and competitive cost of Stanadyne's Fuel Manager systems.

## FUEL ADDITIVES



Stanadyne Fuel Additives are approved by several engine OEMs and are designed to improve engine performance, reduce emissions and provide cold weather protection. All Stanadyne diesel fuel additives meet Ultra Low Sulfur Diesel requirements and are compatible with all types of fuel injection systems including high pressure common rail.

### Performance Formula®

A premium, all-season, multifunction diesel fuel additive. Provides cold and hot weather protection, increases horsepower and fuel economy, cleans and protects fuel system components, improves start-up and reduces smoke and particulate emissions.

### Performance Formula® Junior

A low cost alternative to Performance Formula with many of the same features — but without cetane improvers and cold weather protection.

### Winter 1000®

Cold weather protection at an economical price.

### Lubricity Formula®

Formulated for use with diesel fuels with reduced lubricating qualities such as jet fuel, kerosene and winter blends.

### Injector Cleaner for Gasoline (Petrol) Engines

Restores performance by cleaning injectors and reducing deposits on intake valves.

## GLOBAL PRECISION MANUFACTURING SERVICES

Precision Components & Assembly is the contract manufacturing service of Stanadyne. PCA™ applies the extensive capital and intellectual resources of Stanadyne to fulfill the needs of customer designed, high volume, complex component manufacturing and assembly.



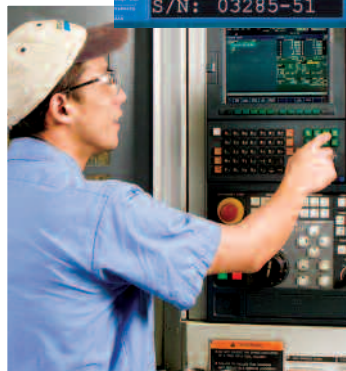
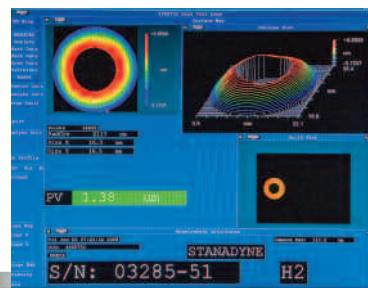
### Sub-micron level machining is our expertise

- Turning
- Milling
- Grinding
- Super-finishing
- Electrochemical Machining
- Abrasive Flow Machining
- Thermal Deburring
- Ultrasonic Cleaning

### Complete heat treatment and metallurgy capability

#### TS16949/ISO 14001 Compliant

Our facilities in China, India, Italy and the United States will compliment your global supply strategy.



# WORLDWIDE OPERATIONS

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