

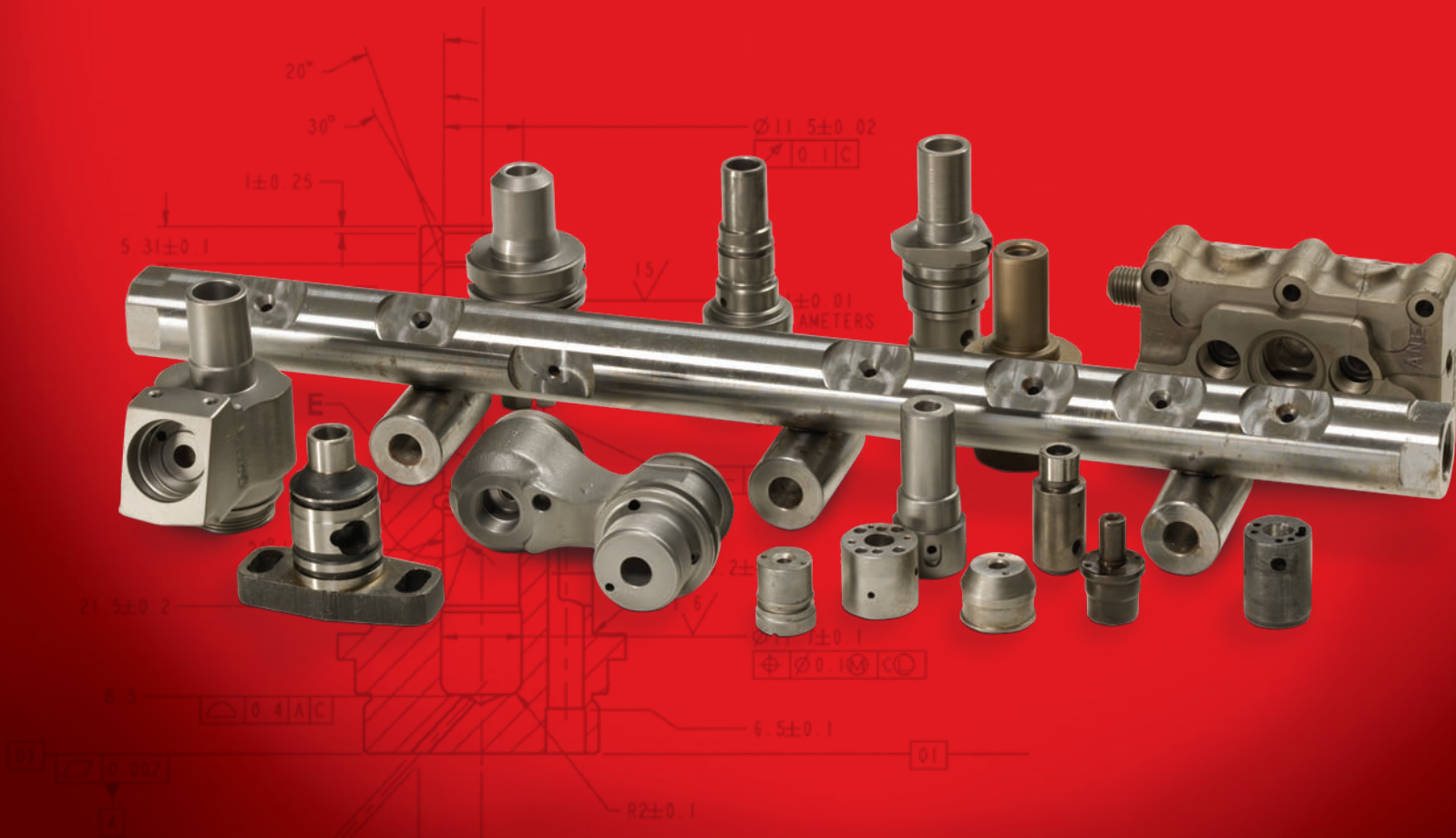


ABOVE AND BEYOND HONING



DIESEL INJECTION COMPONENT

PRECISION BORE MACHINING SYSTEMS & SOLUTIONS



WHEN IT COMES TO HONING DIESEL INJECTORS, SUNNEN DELIVERS.

MORE MACHINES | MORE TOOLING | MORE ABRASIVES | MORE HONING FLUIDS | MORE GAGING | MORE FIXTURING | MORE AUTOMATION | MORE PRECISION | MORE CHOICES



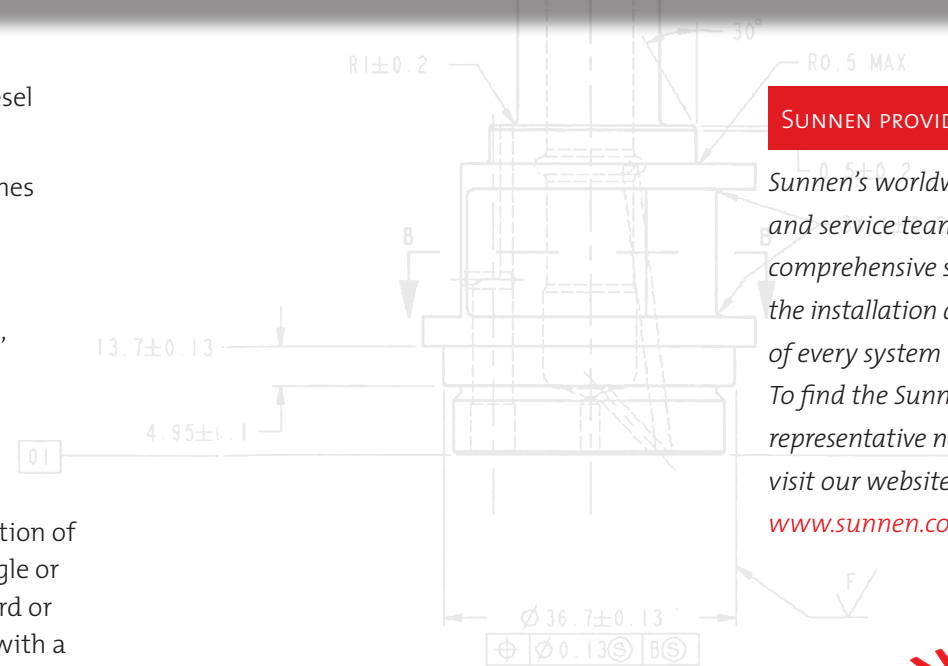
With over 80 years of technological leadership, Sunnen has *the* solution for precision honing of diesel injection components. Our advanced, precision bore machining technology:

- Delivers improved bore geometry on high pressure injectors for lower emissions and better fuel economy
- Creates greater consistency of surface finishes, which means less wear, better lubricity, and longer injector life
- Provides improved process control and greater accuracy for fewer class sizes and lower manufacturing costs
- Provides greater system reliability and tool life, which means fewer tool changes and less operator intervention

We can provide a system for virtually any diesel injector application, including:

- A wide range of materials and surface finishes
- Bore diameters from 3 mm – 32 mm (.118 inch – 1.26 inch)*
- Landed bores, blind bores**, or simple bores, with and without cross holes and grooves
- Individual injectors or common rail system components

Sunnen produces the industry's largest selection of honing machines – horizontal or vertical, single or multi-spindle, automated or manual, standard or customized – and our systems are designed with a focus on reliability, flexibility and ease of use.



SUNNEN PROVIDES GLOBAL SUPPORT

Sunnen's worldwide sales and service team provides comprehensive support for the installation and operation of every system we make. To find the Sunnen representative nearest you, visit our website:
www.sunnen.com



* OTHER SIZES AVAILABLE UPON REVIEW.
** DEPENDENT ON PART CONFIGURATION AND TOLERANCES

THE SV-1000 SERIES:
BUILT FOR PERFORMANCE, DESIGNED FOR CUSTOMIZATION.



THE SUNNEN SOLUTION FOR DIESEL INJECTION COMPONENTS

STANDARD & OPTIONAL FEATURES

Low maintenance stainless steel enclosure provides good visibility and ensures operator safety

Over-sized stroke guideways ensure superior performance and long, trouble-free life

Precision high-torque output belt-drive spindle

Patent-pending load sensing feed system optimizes cycle time

Advanced servo stroke control delivers a consistent crosshatch pattern and allows the machine to short stroke or dwell in any part of the bore

Multiple spindle configurations

Menu-driven operator interface with standard bore profiles

Brushing stations (optional brushing station shown)

Rugged, solid cast polymer composite base reduces vibration for enhanced performance and precision honing

SV-1000 SERIES VERTICAL HONING MACHINES

The SV-1000 Series is capable of holding the industry's tightest production environment tolerances – as fine as 0,00025 mm (0.000010 inch) – tolerances far superior to I.D. grinding.

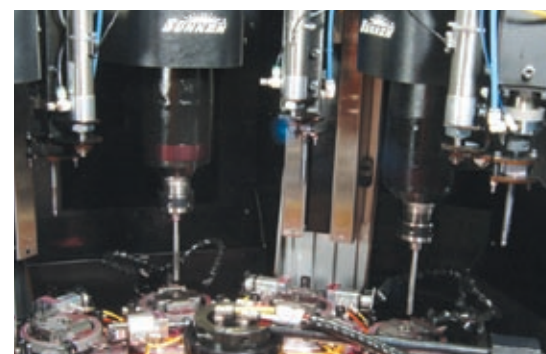
Built on a proven, modular platform, the SV-1000 Series can be easily customized and automated to suit your exact specifications – whatever your needs demand, from multiple spindles to air gaging. Plus, this flexible system supports both single-pass and conventional reciprocating honing. Brushing stations can also be added.

Perfect for mid- to high-production manufacturers, the SV-1000 Series delivers the lowest cost per honed part with the tight bore tolerances you expect from Sunnen.

BORE DIAMETER RANGE (I.D.):
3 mm – 65 mm
(.118 inch – 2.56 inch)*

* OTHER SIZES AVAILABLE UPON REVIEW.

CUSTOM AIR-GAGING



CUSTOM ROBOTIC PARTS HANDLING



STANDARD ON SV-1015:
12-POSITION ROTARY AIR-UNION



CUSTOM FIXTURES AND TABLE CONFIGURATIONS



OTHER FEATURES & OPTIONS:



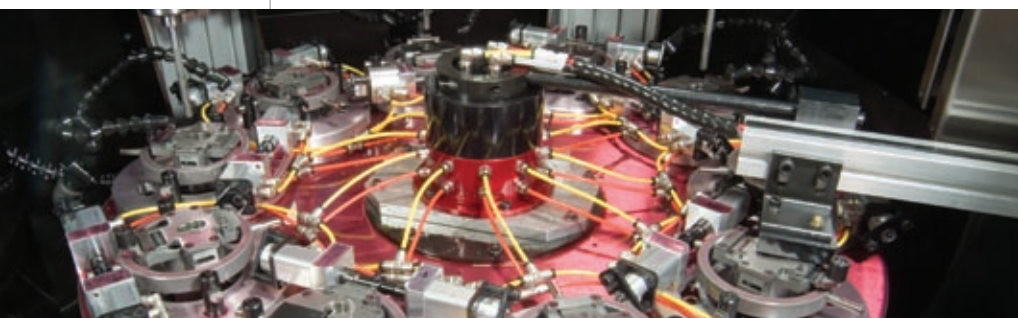
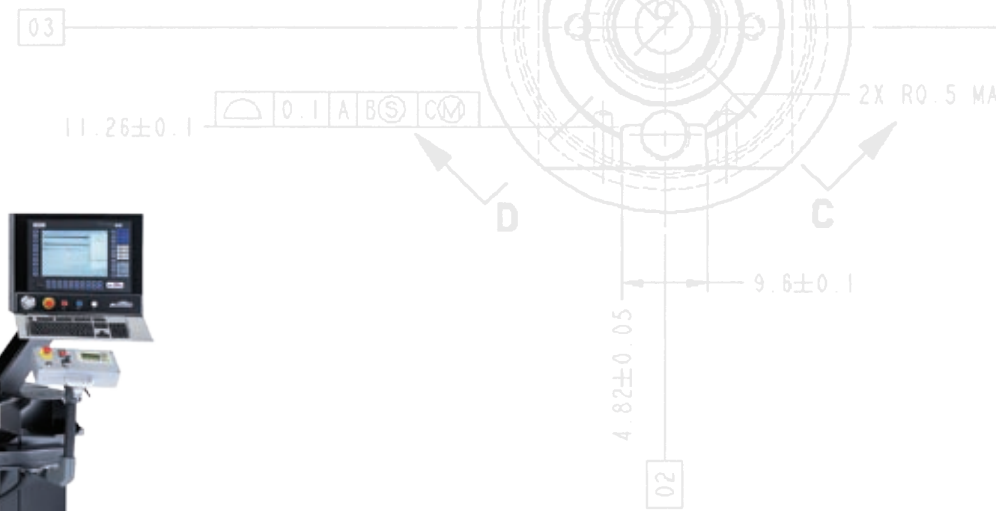
CUSTOM, HIGH-PRODUCTION VERTICAL HONING SYSTEMS

Since 1924, Sunnen has defined the state of the art in the industry, and our current generation of high precision honing systems represents the very finest solutions available anywhere in the world. Sunnen systems are reliable, durable, and flexible and are designed to deliver the precision our customers have grown to expect.

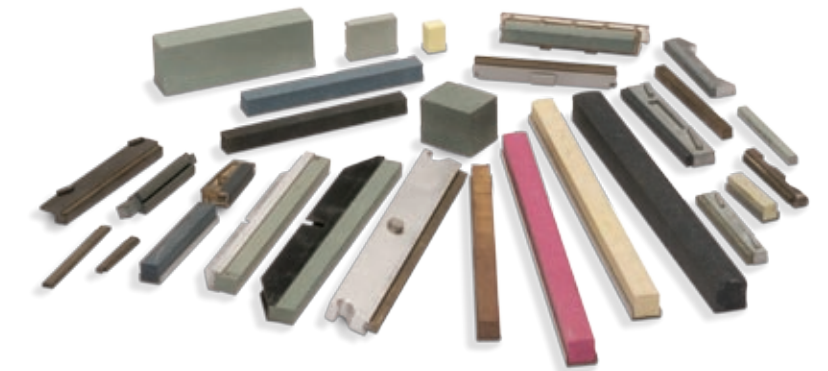
From design to delivery, you have the Sunnen commitment to service and quality. Our technical experts will work with you to create a complete solution to fit your exact

requirements, including the machine model, number of spindles, style of tooling, fixture design, abrasives selection, automation and gaging packages, and any other platform customization you may require.

After your system is built, we'll set up a live run-off demonstration at our facility. Once it meets all specifications, we'll commission your system and train your staff.



"BECAUSE OF THEIR VERSATILE DESIGN, WE CAN CUSTOMIZE AND AUTOMATE MANY OF OUR SYSTEMS TO MEET YOUR SPECIALIZED HONING REQUIREMENTS. JUST CONTACT YOUR SUNNEN REPRESENTATIVE FOR A FREE NEEDS ANALYSIS TO GET THE DESIGN PROCESS STARTED."



TOOLING

Sunnen offers an extensive line of tooling that delivers precise, accurate and consistent bore sizing of diesel injection components. Tooling choices include diamond or CBN multi-stone tools and vitrified abrasive tools.

MMT MULTI-STONE MANDRELS

These mandrels offer faster cycle times, superior accuracy, longer time between stone changeovers, and maintain superior bore geometry. They are designed in both single-stone and multiple-stone configurations, whichever is determined to be best suited for the particular application.

CUSTOM-DESIGNED FOR YOUR SPECIFIC APPLICATION

ABRASIVE SELECTION INCLUDES METAL BOND CBN OR DIAMOND ABRASIVES

CGT Tools

KROSSGRINDING® Plated Diamond Tools
High-Precision, plated diamond tools deliver extreme accuracy and long life (tool wear is next to zero per cycle). These tools hold tolerances to within 0,00025 mm (0.000010 in), even in a production environment.

BORE DIAMETER RANGE:

3 mm - 32 mm
(.118 inch - 1.20 inch)*

SUNNEN-MADE ABRASIVES & LUBRICANTS

From aluminum oxide to silicon carbide to diamond and CBN, Sunnen offers the industry's largest variety of mounted or un-mounted stick abrasives, bond types, grain sizes and stone configurations.

Before any stone is shipped, it is graded and qualified, maintaining the most exacting quality control standards in the industry to assure you of the most precise honing performance available.

Sunnen offers the right honing oil or waterbase coolant for virtually any honing application. The use of Sunnen's premium line of lubricants will help produce the lowest overall honing cost per part.

SUNNEN TOOLS CAN BE USED WITH EITHER WATER- OR OIL-BASED COOLANTS, DEPENDING ON APPLICATION, AND ARE SUITED FOR USE WITH OTHER, NON-SUNNEN HONING MACHINES AS WELL.

*OTHER SIZES AVAILABLE UPON REVIEW.



A LEGACY OF EXCELLENCE SINCE 1924.

WORLDWIDE

Our global manufacturing, distribution, and sales and service network allows us to deliver quality Sunnen solutions worldwide.

And our state-of-the-art Technical Services Centers allow our technical experts to develop innovative solutions to customer application challenges. The Centers also provide answers for customer questions and training for Sunnen representatives around the world.

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