System Solutions For
The Fuel Cell Industry

Your Resource For Fluid Control
and Conditioning Solutions
Parker’s capability to provide the fuel cell industry with total system solutions is by design. Parker Hannifin Corporation is a world-leading manufacturer of engineered components and systems for a wide range of fluid control applications. Parker appreciates the far-reaching benefits of a hydrogen-based economy, and is uniquely positioned to assist the fuel cell industry along the challenging road toward commercialization.

**One Stop Supplier/Partner**

Parker understands that controlling the pressure, temperature and flow of fluids into and out of the fuel cell stack is vital to overall system performance. No other single manufacturer has the breadth of product that enables fuel cell OEMs to enhance system performance while meeting commercialization goals.

Parker has an established track record of successfully helping customers cut operating costs by reducing complexity and speeding assembly, as well as improve the performance of engineered systems. And Parker’s Premier Customer Service initiatives, worldwide distribution and field technical support are second to none.

**Engineered Components and Systems**

Parker products with application potential in fuel cell stacks and systems include: filtration products, control valves, precision pumps, air dryers, heat exchangers, pressure regulators and transducers, positioning tables, seals, manifolds, fittings and tubing. Unlimited product availability is only part of Parker’s commitment to the fuel cell industry. Additionally, Parker has the engineering resources to design and manufacture custom products and subsystems. Strong application and design engineering expertise, along with ISO quality manufacturing and reliability, make Parker the obvious choice for your fluid control and conditioning partner.

**Fuel Cell Systems Business Unit**

One of the major obstacles to broad-based commercialization of fuel cell systems is their current cost/output ratio ($/kW). Today, Parker is helping the fuel cell industry address this issue, and make the transition from the lab to the factory floor, with the establishment of a centralized Fuel Cell Systems Business Unit. The FCSBU is dedicated to providing the engineering and manufacturing expertise to drive down total system costs, improve system reliability and enhance performance. Call today and let Parker be your single point of contact for all of your cell stack and balance of plant component and system needs.

www.parker.com/fuelcells
# Products For Fuel Cell Applications

*Parker makes over 500,000 parts to meet your system needs*

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**Parker Components & Integrated Subsystems Enable Fuel Cell Commercialization**

This example illustrates how fuel cell OEMs can leverage Parker products and engineering resources to streamline their systems and reduce cost.

**Before**
Consider a hypothetical fuel cell subsystem which includes the following components:
- 2 Check Valves
- 3 Filters
- 3 Solenoid Valves
- 1 Ball Valve
- 1 Humidifier
- Several Compression or Welded Fittings
- 3 to 4 Feet of Stainless Steel Tubing

Such a system of discrete components meets all functional requirements, but has the following disadvantages:
- High Labor Cost
- Long Lead Times
- Multiple Vendors
- Large Inventories of Components
- Many Possible Leak Points
- No System Warranty

**After**
Parker’s Fuel Cell Systems Business Unit has the engineering and manufacturing resources to perform “value engineering” on systems like this hypothetical fuel cell subsystem. The resulting integrated subsystem combines the required components and reduces overall mass and volume of the component bodies. Advantages include:
- Dramatic Cost Reduction
- Optimized Solution
- Lower Labor Costs
- Reduced Lead Times
- Single Source Supplier
- One Part Number
- System Fully Assembled and Tested
- Potential Leak Paths Minimized
- Warranted as One Part
- More Conducive to High Volume Production
- Parker Worldwide Distribution/Tech Support

Call Parker today to discuss your Fuel Cell Application.

**Typical PEM Fuel Cell Stack**

- **Endplate with integral manifold and fittings**
- **Bus bars**
- **Membrane electrode assembly (MEA)**
- **Bipolar plate/seal assembly**

**Stack Endplates, Manifolds & Fittings**
Provide mechanical loading forces to the cell stack while integrating the input/output manifold functions. A variety of endplate materials, fitting and coupling options available.

**Metallic Bipolar Plates/Seals**
Machined or formed bipolar plates, with integrally molded elastomeric seals*. Plates are stainless steel, nickel or magnesium with several finish options available.

**Composite Bipolar Plates/Seals**
Bipolar plates fabricated from thermoplastic or thermoset resins with electrically conductive fillers have elastomeric seals* pressed-in-place, over-molded or dispensed onto them for plate/seal assemblies.

**Membrane Electrode Seals**
Elastomeric seals* applied with a pressure-sensitive adhesive, over-molded or dispensed onto Membrane Electrode Assemblies (MEAs) form integrated membrane/electrode/seal assemblies.

*Seal material options include silicone, fluoro silicone, fluorocarbon, nitrile and EPDM.
Designed for uni-directional flow control of fluids and gases. The CO Series is particularly suitable for applications requiring high integrity sealing and resealing capabilities for small molecule gases.

Provides proportional control of fluids, resulting in longer valve life, no pressure spikes, faster response time and less power consumption.

Two-way valves with on and off control for a variety of liquids and gases. Stainless steel and brass construction. Expanded control using multiple solenoid valves in one value-added manifold assembly.

Stack humidifier nozzles with high turn-down ratio. Macrospray pipe injection nozzles for liquid/air mixing.

Hydrogen Delivery

**High Temperature All Metal Seals**
All metal seals for high temperature applications beyond the operating range of elastomeric seals, such as fuel reformers or Solid Oxide Fuel Cells (SOFC).

**Precision Fluid Handling Systems**
Custom solutions to meet demanding requirements for closed loop cooling, fuel delivery systems, and steam generation systems. Magnetically coupled pumps with an integrated motor/drive.

**Pressure Transducer**
Groundbreaking technology utilizes ASIC design and an ultra stable thermo-fused bonding technology that minimizes drift and case stress sensitivity.

**Pressure Regulators**
Versatile backpressure regulator suitable where corrosive media and/or environments are present. Internally threadless high-pressure regulator, excellent for pressure-reducing gases.
Air Cleaner After Cooler Filter Motor

Motor Controller

Air Compressor

Humidifier

Dryers provide clean, dry compressed air with unattended 24-hour, easy, silent operation. Explosion-proof, requiring no electricity, lightweight and compact.

Complete line of products qualified for high pressure applications, available in a variety of sizes and materials including stainless steel.

Complete line of water separation products. Available in a wide range of sizes and can be tailored to satisfy specific application requirements.

Line of heavy duty intake air filtration products can satisfy the most rigorous application requirement. Also available in a range of sizes and port configurations.

Gaseous Fuel Filtration Water Separation Intake Air Filtration Compressed Air Dryers

Air Delivery

Push-to-connect installation on all types of plastic and soft metal tubing. Wide range of water purification and general industrial applications. Materials include Acetal, polypropylene and Kynar™. Pressures to 300 PSI.

For plastic, glass or metal tubing in low pressure and vacuum systems. Hand tight installation, positive tube retention and leak-proof seal. White or black polypropylene, or white nylon. Pressures to 300 PSI.

Flexible and abrasion-resistant nylon with heat and light stability. Pressures to 500 or 625 PSI, depending on series. Clear PVC tubing with exceptional purity, clarity and flexibility. Pressures to 75 PSI.

Flexible and chemical-resistant polyethylene with high-dimensional stability, uniformity, and density. Tough, flexible and kink-resistant polyurethane. Pressures to 300 PSI, depending on series.
Positioning Systems
Linear-motor and ball-screw driven tables and systems used for automating high throughput positioning applications, such as precise fabrication of fuel cell components.

High Pressure Fuel Filters
Available media from 3 micron cellulose for particulate removal, to Grade 4C coalescing with a 99.995% capture efficiency on sub-micronic contaminants.

Compressed Gas Filters
Housings available with oil removal (coalescing), particulate and oil vapor removal elements. Aluminum with powder paint finish, in-line design with a threaded bowl into the filter head. Pressures to 500 PSIG.

In-line Air/Gas Dryer
Engineered for easy desiccant changeouts, longer life and lower pressure drop. Designed to remove water vapor and aerosols from point-of-use gas streams.

Water and Heat Management

Motor-Driven Pumps
Electric, motor-driven and capable of pumping a variety of fluids regardless of viscosity, vapor pressure or dielectric properties. Fewer parts, smaller size, greater contamination resistance and longer reliability.

Instrumentation Fittings
Single and double ferrule in steel, ss and brass. Welded in ss and brass. Pipe and ISO conversion fittings in steel, ss and brass using all thread configurations. High Pressure (MPI™) fittings to 15,000 PSI. All ss fittings are heat code traceable.

Instrumentation Tube Fabricating Equipment
Manual or power-driven. Ensures make-up reliability and reduces long-term maintenance. Tube benders, cutters, deburring and ferrule pre-setting tools, precision gap inspection gauges and rotary wrenches.

Heat Exchangers
Rugged counter-flow heat exchangers in copper, stainless steel and alloy. Compact, high integrity vacuum brazed plate-fin heat exchangers in a range of stainless steel and nickel based alloys.
Engineering Expertise
Parker offers unparalleled design assistance and support. Our dedicated sales and applications engineers can work with you during the design process to optimize system integration, component sizing, performance, and cost. Parker R&D resources offer state-of-the-art technologies from our diverse market segments. From our various operating groups, discoveries and technological advancements can be applied across the corporation for the benefit of our customers.

Single Sourcing
Parker, your one-stop source for fluid control and conditioning, has no rival in total systems single sourcing. Parker’s system capabilities enable customers to reduce their vendor base, while realizing added benefits, such as single point ordering and invoicing, strategic account management and kitting. And we do it all on a global scale.

Premier Customer Service
We provide technical assistance, electronic ordering, and offer customer information in electronic formats. Our worldwide support ensures that your residential, commercial or back-up fuel cell power system can be serviced and supported anywhere around the globe. Parker operates more than 250 manufacturing facilities around the world. This is your assurance of on-time product delivery around the globe. Our employees are empowered to do whatever it takes to meet or exceed customer expectations.

Corporate Strength
As a multi-billion-dollar company, Parker has the resources to develop new manufacturing processes and materials that meet the evolving needs of the fuel cell industry. And with our experience, technical support network and unmatched global presence, we can offer you system solutions wherever your markets are.

We’re Where You Are...Worldwide.

To order products, CDs or additional product information:
Call 1-877-217-4501
Email c-parker@parker.com
Visit www.parker.com/fuelcells

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