



Photo courtesy of Kwik Trip, Inc.

# CNG Vehicle and Fueling System Solutions

Helping create a sustainable future



ENGINEERING YOUR SUCCESS.

# PARKER: A NATU

A leader in the design and manufacture of products and systems that convey and utilize compressed natural gas (CNG), Parker is a natural for natural gas. Our proven, multi-technology subsystems and components in fluid management, motion and fluid control, filtration, and temperature control provide CNG solutions that offer faster development, improved service life, reduced risk, and greater value.



## CNG Challenges

- Developing CNG refueling infrastructure
- Natural gas vehicles can cost up to 40% more than equivalent gas vehicles; natural gas conversion of a gas vehicle can cost up to \$18K
- Shorter driving range
- Longer refueling time
- Greater weight of fuel tank
- Currently only on a limited number of vehicles

## CNG Advantages

- Natural gas (NG) is plentiful in North America and relatively inexpensive, particularly in light of the fact that gasoline and diesel fuel have jumped in price by more than 30%
- NG produces 30% fewer greenhouse gas emissions than gas or diesel
- NG is safer, with a low chance of flammability
- Supply of NG is expected to exceed demand, keeping prices depressed
- Government push to alternative fuels through environmental regulations, tax credits, and incentives
- Using existing natural gas lines makes vehicle refueling at home easy
- NG engine availability is increasing
- NG vehicles offer longer vehicle life with less long-term expense for the consumer





# RAIL FOR NATURAL GAS

Our global footprint assures local availability, no matter where you develop, assemble, or manufacture.

Parker offers a complete product package for CNG including fittings, filters, couplings, valves, hoses, nozzles, and receptacles.

## Parker Solutions

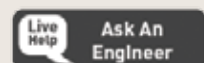
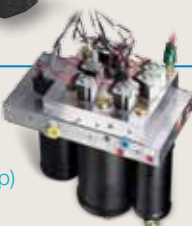
From fittings, filters, and couplings to valves, hoses, nozzles, and receptacles, our complete CNG product package is unmatched in the industry. Our customers also benefit from other value-added advantages:

- Years of extensive experience in design, prototyping, and manufacturing shorten the design cycle, improving production efficiency and simplifying procurement procedures
- Early-on collaboration from concept through production creates competitive advantage
- Our global footprint assures local availability, no matter where you develop, assemble, or manufacture
- Compliant with national and international certification standards
- As a multiple technology provider, Parker saves you time and money by reducing the need for multiple suppliers
- Parker also supports LNG applications



## CUSTOMIZED SOLUTIONS

Parker has the ability to integrate multiple technologies into unique, customer-focused solutions, such as this CNG valve with integrated filter (top) and this manifold using several Parker products (right). Contact Fluid Control Division at (860) 827-2300 to find out more. Or follow this path online to chat live with an engineer: <http://parker.com/fcd>Support>Live Help Ask An Engineer>.



# ON VEHICLE

Collaborate with Parker for CNG solutions that fuel competitive advantage.

From the refueling receptacle to the engine compartment, Parker offers the CNG components that make a noticeable difference in performance, plus the expertise to put it all together for you. Our global experience in the design of fuel systems for medium- and heavy-duty vehicles is well respected in the industry. And customers have local access to Parker channels throughout North America.

## REGULATION

- 1 New gas regulator system features machined or cast body gas regulator with any or all of the following options:
  - Integrated filters
  - Pressure sensors
  - Lock-off solenoid valve
  - Heat exchanger
  - Low-pressure relief valve

## VALVES AND RECEPTACLES

- 2 High-pressure CNG valves
- 3 Low-pressure CNG valves
- 4 Check valves
- 5 Receptacles
- 6 HB4 Series ball valves
- 7 B Series ball valves





## CNG COMPLIANCE

Parker products meet the following standards. Reference product listings on the following pages for exact compliance.

- CSA
- UL
- ISO 15500
- ECE
- NFPA
- ANSI/IAS
- NGV3.1

## FUEL CONVEYANCE

- 8 Low-pressure CNG hose
- 9 High-pressure CNG hose
- 10 Seal-Lok™ for CNG O-ring Face Seal fittings  
CPI™ single ferrule tube fittings  
A-LOK® double ferrule tube fittings

## FILTRATION

- 11 High-pressure filters
- 12 Low-pressure filters



Proven multi-technology subsystems and components.

## GAS REGULATOR SYSTEM



### NEW! Veriflo Gas Regulator System

Available with multiple options, Parker's new integrated gas regulator system provides advanced fuel handling performance. Piston regulator design delivers better control, fewer connections, and longer range.

- Optimized for 6 to 15 liter engines
- Stable, precise pressure control of CNG from 225 psi (15 bar) through 3,600 psi (248 bar) inlet pressure
- Tested and designed for extreme environmental operating conditions
- Specially designed sealing materials for optimal performance even in extreme -40°F (-40°C) and +135°F (60°C) ambients
- Better vehicle range through optimized performance
- Integrated filters, inlet solenoid valve, and heat exchanger options
- Eliminates cold weather icing problems
- Configuration options available

## VALVES AND RECEPTACLES



### High-Pressure CNG Valves

Located between the pressure regulator and fuel injection system, our high-pressure, high-flow, two-way normally closed valves offer higher working pressure than competitors' models and all stainless steel construction for optimum performance.

- Bubble-tight maximum allowed leakage
- ISO 15500 / ECE R110 approval in process

### Low-Pressure CNG Valves

Two-way, brass, normally closed valve line specifically designed for low-pressure CNG applications. Offers exceptionally high flow for a low-pressure valve. Located downstream of the pressure regulator.

- Bubble-tight maximum allowed leakage
- ECE R110 approved valve; 3/8" and 1/2" NPT available

### Check Valves

Located on the fuel line between the fill receptacle and the fuel tank, Parker's CVS-363 check valve allows depressurization of the nozzle and receptacle, preventing return flow.



- Uni-directional flow control

### HB4 Series Ball Valves

Provide reliable shutoff or switching functions. Upper and lower trunnion bearings enhance the resistance of the trunnions against seizure, and increase the valve life in extreme applications.

- Compact and rugged design
- Spring-loaded seats for high cycle life and low operating torques at pressures up to 10,000 psig (689 bar)
- Perfect for diverter applications such as fueling / defueling vehicles



### B Series Ball Valves

Manually, pneumatically, and electrically actuated two-way B Series ball valves provide quick, 1/4 turn, on-off control of natural gas.

- Certified by CSA for NGV applications such as bulk containers and manual shutoff on vehicle fuel systems as per NFPA 52
- Proven and used on trucks, buses, and cars around the globe

### Receptacles

Parker's FMS Series receptacles are available in 3,000 and 3,600 psi (207 and 248 bar) versions. A high-flow version is also available for fast fill applications. NGV1 compliant, they offer a common profile for easy connectivity with other manufacturers' compliant products.

## FUEL CONVEYANCE



### 5CNG High-Pressure CNG Hose

Flexible, lightweight hose serves as primary conveyance of CNG in all areas of the vehicle system up to the firewall. Class A assemblies rated to 150°F (65° C) and Class D assemblies rated to 185°F (85° C), both at 5,000 psi (345 bar).

- Conforms to and listed per: NFPA 52, ANSI/IAS NGV 4.2, ECE R110 and CSA 12.52
- Electrically conductive
- Dampens vibration and noise
- Up to 30% lighter than rigid tubing
- Very flexible; easy to install with faster routing and simple maintenance
- Robust hose design resists fatigue,



### SS23CG Low-Pressure CNG Hose

CNG compatible low-pressure, rubber-covered hose with nylon inner tube. High temperature rated to 250°F (121° C) at 425 psi (29 bar). Flexible with a small bend radius for easy routing.

- CAN / CGA-8.1-M86 Type III
- Meets UL 21 588, 569 specifications
- Meets ECE R110 / R67 specifications

### CPI™ Tube Fittings

Single ferrule tube fittings of precision-engineered parts designed to provide secure, leak-proof connections on vehicle. Suparcase® ferrule design works well in vibration-prone applications due to its unique “bowing” action between the body seat.



- Proven in thousands of critical vibration and pressure applications, including CNG
- Molybdenum coated nut with fine pitch threads ensures no galling
- Single pre-swaged ferrules minimize chances of incorrect assembly

### A-LOK® Tube Fittings

Two ferrule tube fittings of precision-engineered parts designed to provide secure, leak-proof connections on vehicle. Manufactured to the highest quality standards.



- Proven in CNG applications around the globe
- Available in a broad range of sizes, materials, and configurations

## FILTRATION

### FFC-110 / 110L Filters

Positioned on the low-pressure side of the vehicle system between the pressure regulator and the fuel injectors. Protect fouling of fuel injectors. Multiple sizes, efficiency grades for application versatility.

- 800 psig (55 bar) maximum pressure is highest known



### FFC-112 / 112L / 113 Filters

Positioned on the high-pressure side of the vehicle system between the storage tank and the pressure regulator where pressures can typically reach 3,600 psig (248 bar). Protects regulator from contaminant buildup.



### FFC-213 / 3600 PSIG Filters (Aluminum)

The new, FFC-213 is another popular filter for onboard alternative fuel vehicles. It removes sub-micronic contaminants with removal efficiencies from 95% (grade 10) to 99.97% (grade 6), ensuring long service intervals for components like fuel injectors and regulators.

- Lightweight aluminum construction
- 3600 PSIG design pressure
- withstands harsh operating environments



## Seal-Lok™ for CNG O-ring Face Seal (ORFS) Fittings

Leak-free, vibration-resistant ORFS threaded connections available in inch (1/4" to 3/4") and metric (6 mm to 20 mm) sizes for high- or low-pressure CNG applications using hard tube or hose. Seal-Lok for CNG provides a zero clearance fitting system which allows for ease of assembly in tight installation areas.



- Resistant to over-torque up to 200%
- Unlimited reusability with only seal replacement needed
- Tested and certified by TUV to ECE R110, ANSI NGV3.1-2012 / CSD 12.3-2012, and ISO 15500 in the following materials: steel, stainless steel, and XTR (zinc nickel) plated
- Seal-Lok Xtreme available for LNG applications

For consumer or fleet CNG refueling, connect with Parker.

Our complete line of CNG filtration, conveyance, dispensing, and valve solutions connect you to added efficiency and faster fill times. Have a unique application or the need to push the envelope of innovation? We can support that, too, with a team of CNG experts that will help to engineer your success.

## FILTRATION

- 1 High-pressure filters

## FUEL CONVEYANCE AND DISPENSING

- 2 Valves and manifolds
- 3 CNG hose
- 4 Seal-Lok™ for CNG O-ring Face Seal fittings
- 5 CPI™ tube fittings
- 6 A-LOK® tube fittings
- 7 Fuel line breakaways
- 8 Nozzles / nozzle docks

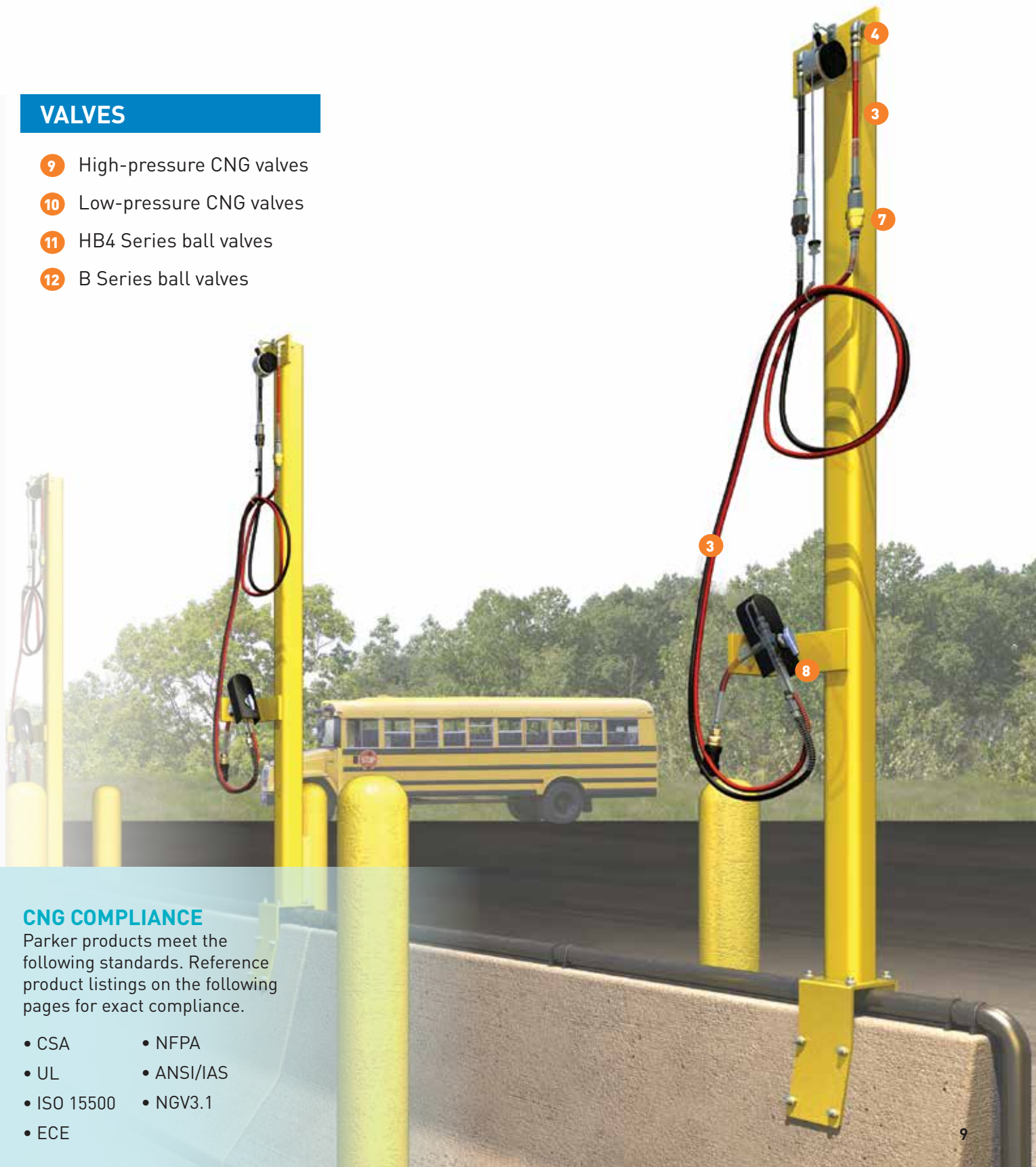




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## VALVES

- 9 High-pressure CNG valves
- 10 Low-pressure CNG valves
- 11 HB4 Series ball valves
- 12 B Series ball valves



### CNG COMPLIANCE

Parker products meet the following standards. Reference product listings on the following pages for exact compliance.

- CSA
- NFPA
- UL
- ANSI/IAS
- ISO 15500
- NGV3.1
- ECE

Added efficiency. Faster fill times.

## VALVES



### High-Pressure, High-Flow CNG Valves

Located between the pressure regulator and fuel dispensing apparatus, our high-pressure, high-flow, two-way normally closed valves offer higher working pressure than competitors' models and all stainless steel construction for optimum performance.

- Bubble-tight maximum allowed leakage
- Available in NPT connections up to 1/2"

### Low-Pressure, High-Flow CNG Valves

Two-way, brass, normally closed valve line specifically designed for low-pressure CNG applications. Offers exceptionally high flow for a low-pressure valve. Located downstream of the pressure regulator.

- Bubble-tight maximum allowed leakage
- Diaphragm option available for higher flow needs



### HB4 Series Ball Valves

Provide reliable shutoff or switching functions. Upper and lower trunnion bearings enhance the resistance against seizure, and increase the valve life in extreme applications.

- Compact and rugged design
- Spring-loaded seats for high cycle life and low operating torques at pressures up to 10,000 psig (689 bar)
- Perfect for safe and economical dispensing applications on time fill stands and dispensers when combined with Parker Snap-tite NGV 1 nozzles.



### B Series Ball Valves

Manually, pneumatically, and electrically actuated two-way B Series ball valves provide quick, 1/4 turn, on-off control of natural gas.

- Broad selection of valve body, seat, and seal materials provide a wide range of operating pressures and temperatures
- Perfect for bulk and high flow / high cycle applications with up to 100,000 cycles of trouble-free performance without any seat changes

## FILTRATION

### M-Series Filters

Available in a variety of filter sizes and media, these 800 psig (55 bar) filters have multiple applications in a CNG system. Use them as contaminant protection in pre- and post-filters for a gas dryer, a compressor intake filter, and inner-stage compression filters. Excessive lubrication oil can create contamination problems in a compressor, especially at the higher pressures involved in the later stages of a multi-stage compressor.

- 800 psig (55 bar) maximum pressure ensures reliability
- Excellent corrosion resistance
- Easy drainage without bowl removal
- Multiple sizes and media choices



### J-Series Filters

5,000 psig (345 bar) filters remove solid and liquid contaminants from natural gas. Available in a variety of filter sizes and media, these versatile filters can be used as a compressor post-filter to storage cascades and fuel dispensing equipment.

- More filter choices than any other competitor
- Easy drainage without bowl removal
- Optional high-pressure drain kits allow drainage while system is pressurized



## FUEL CONVEYANCE AND DISPENSING



### Valves and Manifolds

High integrity, precision instrumentation check, bleed/purge, needle, and pressure relief valves and manifolds for all isolation, regulation, direction control, and over-pressure protection applications.

### Nozzle and Nozzle Dock

ANSI / CSA / NGV1 standard refueling nozzles for public or private use. Can be classified as Type 2 or 3, for use in both fast-fill or time-fill service. Non-marring polyurethane sleeve protects vehicle body from surface damage.

Situated on the fueling station, our NGVND nozzle dock holds the nozzle when not in use, keeping it clean and readily accessible.



### Fuel Line Breakaway

The NGVBCN2-P50 breakaway is certified to ANSI / NGV4.4 / CSA 12.54 standards for breakaway devices used on natural gas dispensing hoses and systems. It allows the hose to safely disconnect, preventing damage to the dispenser in the event of "drive off," sealing the CNG in the line to prevent leakage and hose whip.



- Pressure balanced
- Reliable performance



### 5CNG High-Pressure CNG Hose

Conveys CNG from the storage tank to the dispenser and into the vehicle. Specially developed for this application, Parker's CNG hose is constructed of an electrically conductive nylon core designed to dissipate static buildup. Rated to 185°F (85° C) at 5,000 psi (345 bar).

- Conforms to and listed per: NFPA 52, ANSI/IAS NGV 4.2, ECE R110, and CSA 12.52
- Electrically conductive
- Dampens vibration and noise
- Up to 30% lighter than rigid tubing
- Very flexible; easy to install with faster routing and simple maintenance
- Robust hose design resists fatigue, corrosion, and environmental effects
- Available in a bonded twin-line hose construction

### Vent Line Breakaway

Placed on the fuel return line, our NGVBCN2-VL breakaway ensures the venting of the CNG hose in the event of a "drive off."

- Reliable performance



### A-LOK® Tube Fittings

Two ferrule tube fittings of precision-engineered parts designed to provide secure, leak-proof connections on vehicle. Manufactured to the highest quality standards.

- Proven in CNG applications around the globe
- Available in a broad range of sizes, materials, and configurations



### Seal-Lok™ for CNG O-ring Face Seal (ORFS) Fittings

Leak-free, vibration-resistant ORFS threaded connections available in inch (1/4" to 3/4") and metric (6 mm to 20 mm) sizes for high- or low-pressure CNG applications using hard tube or hose. Seal-Lok for CNG provides a zero clearance fitting system which allows for ease of assembly in tight installation areas.

- Resistant to over-torque up to 200%
- Unlimited reusability with only seal replacement needed
- Tested and certified by TUV to ECE R110, ANSI NGV3.1-2012 / CSD 12.3-2012, and ISO 15500 in the following materials: steel, stainless steel, and XTR (zinc nickel) plated
- Seal-Lok Xtreme available for LNG applications

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- Proven in thousands of critical vibration and pressure applications, including CNG
- Molybdenum coated nut with fine pitch threads ensures no galling
- Single pre-swaged ferrules minimize chances of incorrect assembly





## Parker Divisions for these CNG products

### **FILTRATION**

Parker Hannifin Corporation  
**Finite Airtek Filtration Division**  
500 S. Glaspie Street  
Oxford, MI 48371  
phone 248 628 6400  
fax 248 628 1850

### **CNG VALVES**

Parker Hannifin Corporation  
**Fluid Control Division**  
95 Edgewood Avenue  
New Britain, CT 06051  
phone 860 827 2300  
fax 860 827 2384

### **CNG SUPPLY AND RETURN LINE HOSE**

Parker Hannifin Corporation  
**Hose Products Division**  
30240 Lakeland Blvd.  
Wickliffe, OH 44092  
phone 440 943 5700  
fax 440 943 3129

### **CNG HOSE**

Parker Hannifin Corporation  
**Parflex Division**  
1300 N. Freedom Street  
Ravenna, OH 44266  
phone 330 296 2871  
fax 330 296 8433

### **SEAL-LOK™ FOR CNG O-RING FACE SEAL FITTINGS**

Parker Hannifin Corporation  
**Tube Fittings Division**  
3885 Gateway Blvd.  
Columbus, OH 43228  
phone 614 279 7070  
fax 614 279 7685

### **CPI™/A-LOK® FITTINGS AND BALL VALVES**

Parker Hannifin Corporation  
**Instrumentation Products Division**  
1005 A Cleaner Way  
Huntsville, AL 35805  
phone 256 881 2040  
fax 256 881 5730

### **GAS REGULATOR SYSTEM**

Parker Hannifin Corporation  
**Veriflo Division**  
250 Canal Blvd.  
Richmond, CA 94804  
phone 510 412 1100  
fax 510 412 1263

### **BREAKAWAY VALVES, RECEPTACLES, AND NOZZLES**

Parker Hannifin Corporation  
**Quick Coupling Division**  
8145 Lewis Road  
Minneapolis, MN 55427  
phone 763 544 7781  
fax 763 544 3418

