

PUMPS AND VALVES FOR THE HYDROGEN ECONOMY



INNOVATIVE, INDUSTRY-LEADING SOLUTIONS

As one of the largest pump and valve manufacturer in the world, with a broad range of technologies, CIRCOR supplies the solutions you need to solve fluid- and gas handling challenges in the new hydrogen economy.

FIND YOUR HYDROGEN APPLICATION

Application	Product								
	Centrifugal Pumps	Side Channel Pumps	3-Screw and Twin-Screw Pumps	Progressing Cavity Pumps	Control Valves	Isolation Valves	Pressure Regulators	Pressure Control Accessories	Panels & Skid Solutions
Power to Hydrogen									
Electrolysis	x				x	x			
Hydrogen to Power									
Fuel cells	x				x	x			
Gas turbines	x		x		x	x			
Gas engines	x		x		x	x			
Transport & Storage – Compressed Hydrogen (CH₂)									
Tube trailers						x	x	x	x
Static Storage						x	x	x	x
Hydrogen Storage to Process									
Trailer Loading						x		x	x
Trailer Decanting (Pressure / Flow Control)						x	x	x	x
Hydrogen Distribution Systems								x	x
Transport & Storage – Liquid Organic Hydrogen Carriers (LOHC)									
Storage process	x	x	x		x	x			
Terminals and vessels	x	x	x						
Release process	x	x	x		x				
Synthesis of E-Fuels									
E-Fuels: Power-to-Liquid, Fischer-Tropsch synthesis	x	x	x	x					
Synthesis of E-Chemicals									
Basic chemicals like ammonia or methanol	x	x	x		x				

PUMPS AND VALVES IN HYDROGEN WIDE RANGE OF PRODUCT TECHNOLOGIES

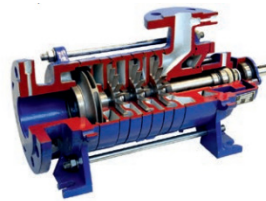
Pumps and valves from CIRCOR are offered under the trusted brands ALLWEILER®, IMO®, IMO AB®, HOUTTUIN™, TUSHACO®, WARREN®, ZENITH®, RTK®, SCHROEDAHL® and HALE HAMILTON®. Our standard and custom engineered fluid- and gas-handling solutions support a wide range of mission critical applications and are essential for the reliable and safe operation of all types of industrial systems.

- **Technology:** Providing the right pumping and valve solution for every application
- **Reliability:** Maintaining performance of the system regardless of operating conditions
- **Availability:** Maximizing the time for production
- **Uptime:** Ensuring run-time consistency without fail
- **Compliance:** Sustaining the commitment to environmental responsibility
- **Cost-effectiveness:** Keeping the plant competitive in a tough global economy



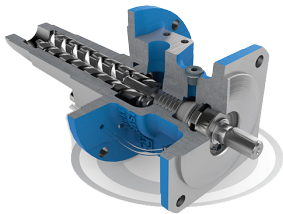
CENTRIFUGAL PUMPS

- ◀ Wide variety of pump types
- ◀ EN 2858 / ISO 5199 and EN 733
- ◀ Flexible and customizable designs with various options
- ◀ Robust, low-maintenance Mag-Drive pumps



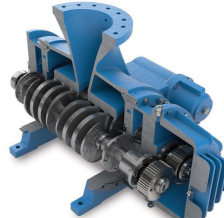
SIDE-CHANNEL PUMPS

- ◀ Self-priming
- ◀ Insensitive to cavitation at variable vapor pressure
- ◀ Ideal for liquids with gas- or vapor-forming components (up to 50%), i.e. for low-boiling liquids like liquefied gas or ammonia



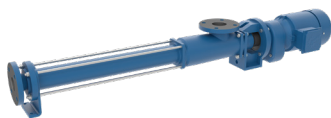
3-SCREW PUMPS

- ◀ Smooth, pulsation-free flow
- ◀ Pump handles broad viscosity range
- ◀ Abrasion resistant
- ◀ Consistent flow as pressure changes



TWIN-SCREW PUMPS

- ◀ The solution when all other pumps fail
- ◀ Non-lubricating, corrosive, abrasive fluids or with gas- or vapor-forming components
- ◀ Excellent for changing process / fluid parameters like flow, pressure, density or viscosity
- ◀ Extremely low NPSHr



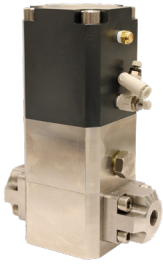
PROGRESSING CAVITY PUMPS

- ◀ Smooth, pulsation-free flow
- ◀ Low shear
- ◀ Same pump handles broad viscosity range including very high viscosities
- ◀ High abrasive fluids with solid content



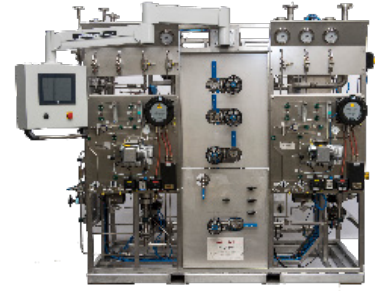
CONTROL VALVES

- ◀ Compact and economical design
- ◀ Customised solutions – Valves, Actuation
- ◀ Low maintenance



ISOLATION VALVES

- ◀ Pneumatically Actuated or Manual Shutoff
- ◀ Product that conforms to PED & TPED (97/23EC & 2017/68/EU)
- ◀ Supplied with threaded and welded connections.



PANEL & SKID SOLUTIONS

- ◀ Stable pressure delivery through application
- ◀ High integrity integrated overpressure protection
- ◀ Configurable with instrumentation, pressure reduction, metering and control equipment.



PRESSURE REGULATORS

- ◀ Configurable design allows for no client engineering
- ◀ Complete solution integrating filters, pilot regulator and external feedback
- ◀ Maintenance via factory tested cartridge inserts



CONTROL ACCESSORIES

- ◀ A large range of accessories for gas control, isolation and filtration
- ◀ Provided with a range of connections (threaded ports, brazed or weld stub)
- ◀ Maintenance via factory tested cartridge inserts

CASE STUDY – DELIVERING DEMINERALIZED WATER PUMPS FOR THE LARGEST PEM-ELECTROLYSIS PLANT IN THE WORLD

CHALLENGE

A major manufacturer for electrolysis systems was looking for a pumping solution for the largest PEM electrolysis plant built in the world so far. Extremely pure demineralized process water needed be pumped to the stacks. The challenge for our customer was to design a system in an industrial dimension never realized before.

SOLUTION:

With its industry proven and extremely reliable design, ALLWEILER CNH-B pumps are the ideal fit for demineralized water applications for electrolyzers in industrial scale.

Additionally, fast and comprehensive engineering support as well as ALLWEILER's large experience in global industrial projects helped to develop a unique solution, optimally designed for the customer's needs. The customer's engineers were able to rely on ALLWEILER and decided to use CNH-B pumps for this mission critical application.



ALLWEILER CNH-B

CIRCOR IS YOUR PARTNER

End User requirements and specifications for critical equipment can be challenging and individual, especially in a global environment. Our highly experienced technical engineers can support you to master this challenge. We have highly customizable pumps combined with the ability to create tailor made documentations.

Our extremely safe and industrial proven RTK and SCHROEDAHL control valves help you to regulate your flow. HALE HAMILTON isolation valves, pressure regulators and complete pressure regulation and metering systems are the solution for challenges with hydrogen or any other gas.

CASE STUDY – HYDROGEN, CO₂ AND LP AIR SYSTEM DESIGNED FOR A COOLING APPLICATION ON ONE OF THE LONGEST POWER TRANSMISSION PROJECTS IN THE WORLD.

CHALLENGE

A leading supplier of Synchronous Condensers secured a turnkey project for its Synchronous Condensers and needed hydrogen gas supply systems to charge the condensers' cooling systems. The prime safety concern for the system was ensuring it could be purged in and out of service without hydrogen mixing with air as this would create an explosive mixture. As such, CIRCOR was contracted with designing a system which could be safely charged with hydrogen, monitored during operation, then when required, could be safely purged of hydrogen bringing the condenser to a safe state where maintenance activity could be undertaken prior to re-commissioning the system back to use.

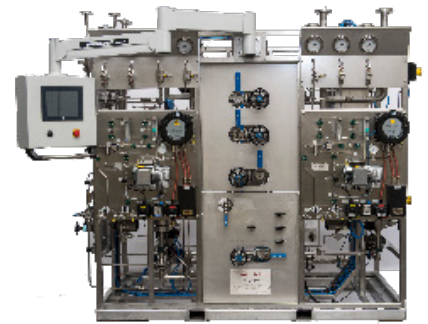
SOLUTION:

CIRCOR system designers worked with the client to establish a process design that would use CO₂ to purge hydrogen from the condenser and then use air to purge CO₂ from the condenser making it safe to maintain.

A gas delivery system was designed and built to take cylinder storage pressure down to injection pressure with an integrated heater system to ensure the gas delivery temperature was maintained at the correct level.

A compressor system was utilised to supply air and a Gas Distribution panel (right) used to charge, vent and continuously analysis the gas. All pressure control equipment utilised CIRCOR pressure regulators, valves, filters and pressure relief devices.

The whole system was factory acceptance testing at our facility in Uxbridge, UK and commissioning assistance was provided at client site to ensure successful setting to work of the system.



PANEL & SKID SOLUTIONS

CIRCOR IS YOUR PARTNER

Finding suppliers with the expertise, capability and product portfolio to provide solutions they can stand behind and support can be difficult at the best of times. **CIRCOR has a broad range of pressure and flow control components and significant system design / integration capability.**

CASE STUDY – SUPPLYING HIGH PRESSURE PRIMARY ISOLATION VALVES AND PRESSURE CONTROL TECHNOLOGIES ENABLING THE SUPPLY OF HYDROGEN TO HYDROGEN FUELLING STATIONS

CHALLENGE

Our client, a supplier of Hydrogen Trailers required valves qualified in accordance with the latest European Transportable Pressure Equipment Directive, a requirement for all valves used to isolate transportable hydrogen storage modules. The valves were required to be used at pressures up to 700 bar(g), at temperatures as low as -40°C with very tight limits on leakage. Without valves qualified to this standard, the trailer could not be certified and put into operation.

SOLUTION:

CIRCOR engineers working diligently to establish a valve capable of meeting these highly demanding requirements. The ASV Series Pneumatically Actuated Stop Valve Series is based on CIRCOR's highly reliable balanced valve concept but includes sealing technologies capable of performing across the range of pressures temperatures and leak rates required setting a new standard for high pressure balanced valve design.

CIRCOR IS YOUR PARTNER

CIRCOR has a broad range of pressure and flow control components for Hydrogen Storage applications including Manual Stop Valves, Regulators, Slam Shut Valves, Residual Pressure Valves, Check Valves, Filters and can build complete Trailer Fill Cabinets for its clients saving space, cost and client engineering resources.



ASV380



CIRCOR is a market-leading, global provider of integrated flow control solutions, specializing in the manufacture of highly engineered valves, instrumentation, pumps, pipeline products and services, and associated products, for critical and severe service applications in the oil and gas, power generation, industrial, process, maritime, aerospace, and defense industries.

Excellence in Flow Control

Asia | Europe | Middle East | North America

ALLWEILER GmbH
Allweilerstr. 1
78315 Radolfzell
Germany
+49 7732 86 0

CIRCOR
1710 Airport Rd
Monroe, NC 28110
USA
+1 704 289 6511

CIRCOR India
LODHA iThink,
9th Floor, A wing,
Off Eastern Express Highway,
Chirak Nagar, Behind Viviana Mall,
Thane West - 400607,
Maharashtra, India
Tel: +91-22-69197300

CIRCOR
No. 2679 Hechuan Road
Shanghai 201103
China
Tel: +86 021 64791017



ALLWEILER® | IMO® | IMO AB® | HOUTTUIN™ | TUSHACO® | WARREN® | ZENITH® | RTK® | SCHROEDAHL® | HALE HAMILTON®

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