Haskel
An Ingersoll Rand Business

Q-DRIVE

THE WORLD'S FIRST SMART ELECTRIC SERVO GAS COMPRESSOR

PROVEN. RELIABLE. EXPERT. **CUSTOMER-FOCUSED.**

Delivering the future-focused innovation you need, combined with the reliability, expertise and support you expect.

For 75 years and counting, Haskel has been recognized as the world's leading provider of high-pressure industrial and high purity gas and liquid gas handling equipment. We not only lead this industry–we helped develop it. It's why the products and solutions we create perform successfully in a variety of demanding environments. And it's why we are consistently selected for mission-critical applications that are fundamental to global sustainability, safety, security, research and exploration.

Q-Drive is one of our latest advancements and revolutionizes high-pressure gas transfer and compression. Designed with smart electric servo drive technology, Q-Drive delivers automated, efficient, clean and quiet compression. This innovative gas compressor is built to offer optimal performance, high flows and infinite controllability.

BECAUSE NO ONE HANDLES HIGH PRESSURE LIKE Haskel
AND NOTHING HANDLES COMPRESSION LIKE Q-DRIVE.

POWERED BY A HIGH-EFFICIENCY SERVO MOTOR

Q-Drive offers an impressive 95% power efficiency.

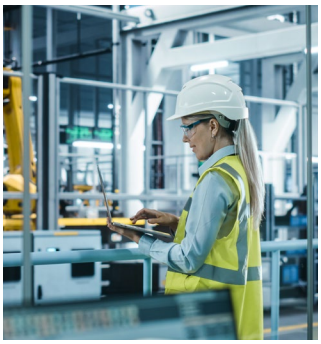
- Smaller footprint without lost flow rate and pressure
- 25% less energy required for cooling than standard hydraulic boosters
- Environmentally friendly with significantly less energy consumption

AUTONOMOUS OPERATION IN A TURNKEY DESIGN

The complete system is ready to go – just connect to power and coolant.

Q-Drive fully integrates into your existing facility control systems and can communicate with other pieces of automation equipment through a suite of the latest communication protocols including OPC UA, Modbus, Bacnet, Allen Bradley ABLogix and Siemens S7, among others.

Additionally, Q-Drive has three pre-programmed modes of operation: Compressor, Fill & Pause and Fill & Stop. Each of these functions, as well as function parameters, can be accessed from the HMI screen on the unit, as well as from the remote system dashboard on a smartphone, tablet or laptop.



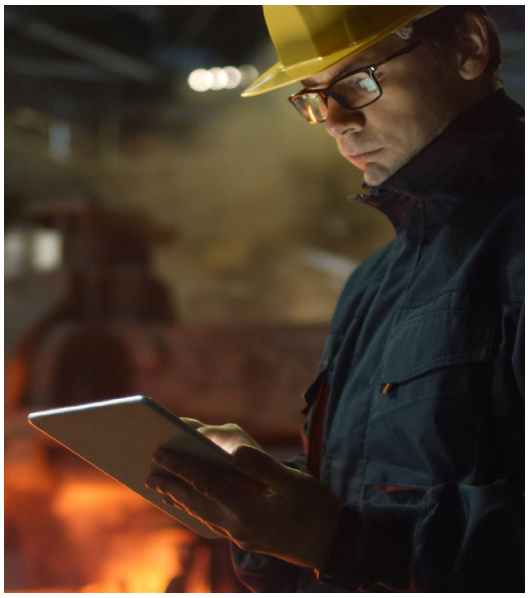
Compressor Mode
Maintains constant user-defined process pressure, cycle rate, and programmed output pressure deadband

Fill & Pause Mode
Continuous operation until user-defined fill volume and pressure are met, causing the system to automatically enter idle mode

Fill & Stop Mode
Operates similarly to Fill & Pause mode, but once the final pressure and volume is achieved, the system vents the residual pressure and shuts off

Intelligent controls paired with an intuitive interface also enable custom programmability and precise controllability for on-the-fly adjustments. To program, set mode of operation, output deadband, cycle rate and target output pressure. The system's smart technology maintains the drive at target pressure through a self-regulating feature that slows the drive cycle down to bring the system to preset levels at a constant pressure mode. When target pressure is achieved, the drive will pause. Once it drops below the set deadband pressure, it restarts itself and repeats the process over and over, until you tell it to stop.

REMOTE MONITORING CAPABILITIES



Access system information at any time from any location.

The advanced control technology within the Q-Drive allows the system to be remotely monitored and controlled by properly authorized users in a secure manner- without them ever having to set foot in the plant. Through a one-of-a-kind remote monitoring dashboard, authorized users can access important metrics like compressor outlet pressures, temperatures, cycle rate and even a historical performance trend information.

- Custom alerts can be received off-site
- Self-correcting functionality
- Patented lubricant leak detection system
- Predictive maintenance
- Multiple account access levels (Supervisor, Operator, Service)

UNSURPASSED SAFETY

Designed with a 4:1 safety factor.

Q-Drive brings safety and reliability to the forefront. The system features ultra-quiet operation and self-monitoring for 30+ built-in sensors to prevent overheating and over-pressurization. Redundant safety features and communication protocols deliver unsurpassed safety levels and the reliability you expect from Haskel.

- Easily accessible E-stop button
- Vent and purge ports for safe location routing
- Operates at or below 77 dBA

SIMPLE MAINTENANCE REQUIREMENTS

Fewer moving parts means fewer failures and longer MTBF.

The servo drive is lubricated with a synthetic gear oil that flows through a lubrication circuit at pressures less than 30 PSI and cooled through a heat exchanger to maintain ideal viscosity.

- Superior design with quick-change seal components
- Advanced diagnostic system reduces maintenance and increases uptime
- Simplified design creates fewer points of failure

OPTIONAL ACCESSORIES & SERVICES

Additional accessories that can help enhance the base system.

Chiller
Q-Drive requires coolant to cool the gas in the integrated heat exchangers and to cool the lubrication oil. If coolant is not available where the Q-Drive will be used, an optional Chiller can be included with the Q-Drive to provide the necessary coolant. The optional Chiller will be external to the Q-Drive, but controlled by the Q-Drive's HMI/PLC Control.

Process Data Collection
Records, transcribes and distributes a detailed history of system values such as temperature, pressure and cycle rate information over time for end customers that may need it for regulatory approval.

Remote Access Assistance
A remote access assistance service that allows a Haskel factory trained technician to log into a Q-Drive unit to remotely access things like system operating conditions and system programming, as well as run diagnostics.

ENDLESS OPPORTUNITIES FOR APPLICATION

Q-Drive is a versatile, flexible machine ready to perform in a variety of ways.

Example applications include:

- **Cylinder Plant Filling**
- **CO2 in the Semiconductor Industry**
- **Extraction of Botanical Oils**
- **General Industry Applications**
  - Small portable tank filling
  - Industrial autoclaves
  - Tank/bottle/storage tube pressure testing
  - Injection molding
- **Oxygen Applications**
  - Large O2 cylinder filling operations
  - Military ops
  - Large healthcare facilities/central filling facilities
  - Commercial diving stations
- **Aerospace Industrial Gas Primary Compression**
- **Aerospace Backup Gas Filling System**
- **Hub and Spoke**
  - Run multiple production lines from a centralized high pressure source

PERFORMANCE BY MODEL

Estimates based on performance values.

Actual system performance depends on several different items, including type of gas, temperature of gas, temperature and flow rate of coolant. If the system temperature gets too high, Q-Drive control will automatically reduce the speed of the system.

Model	Min. Inlet	Max. Inlet	Max. Outlet	Max Flow		
Q45-150	50 psi	1,050 psi	1,230 psi	625	SCFM	1061.882
	3.4 bar	72 bar	85 bar	1062	NCMH	
Q45-90	50 psi	3,200 psi	3,420 psi	639	SCFM	1085.668
	3.4 bar	220 bar	235 bar	1086	NCMH	
Q45-63	50 psi	3,250 psi	6,600 psi	305	SCFM	518.1984
	3.4 bar	224 bar	455 bar	518	NCMH	
Q45-45	50 psi	7000 psi	15,000 psi	274	SCFM	465.529
	3.4 bar	483 bar	1,034 bar	466	NCMH	
Q45-150/90	50 psi	500 psi	3,420 psi	147	SCFM	249.7546
	3.4 bar	34 bar	235 bar	250	NCMH	
Q45-150/63	50 psi	225 psi	6,600 psi	65	SCFM	110.4357
	3.4 bar	15 bar	455 bar	110	NCMH	
Q45-90/63	50 psi	2,000 psi	6,600 psi	200	SCFM	339.8022
	3.4 bar	138 bar	455 bar	340	NCMH	

All flow estimates are at 50 cycles per minute.

The Q-Drives technology allows for a very wide range of inlet and outlet pressures, the performances shown are for specific parameters.

Please contact a Haskel distributor to determine how Q-Drive can meet your specific performance requirements.

THE WORLD TRUSTS Haskel TO HANDLE HIGH PRESSURE.

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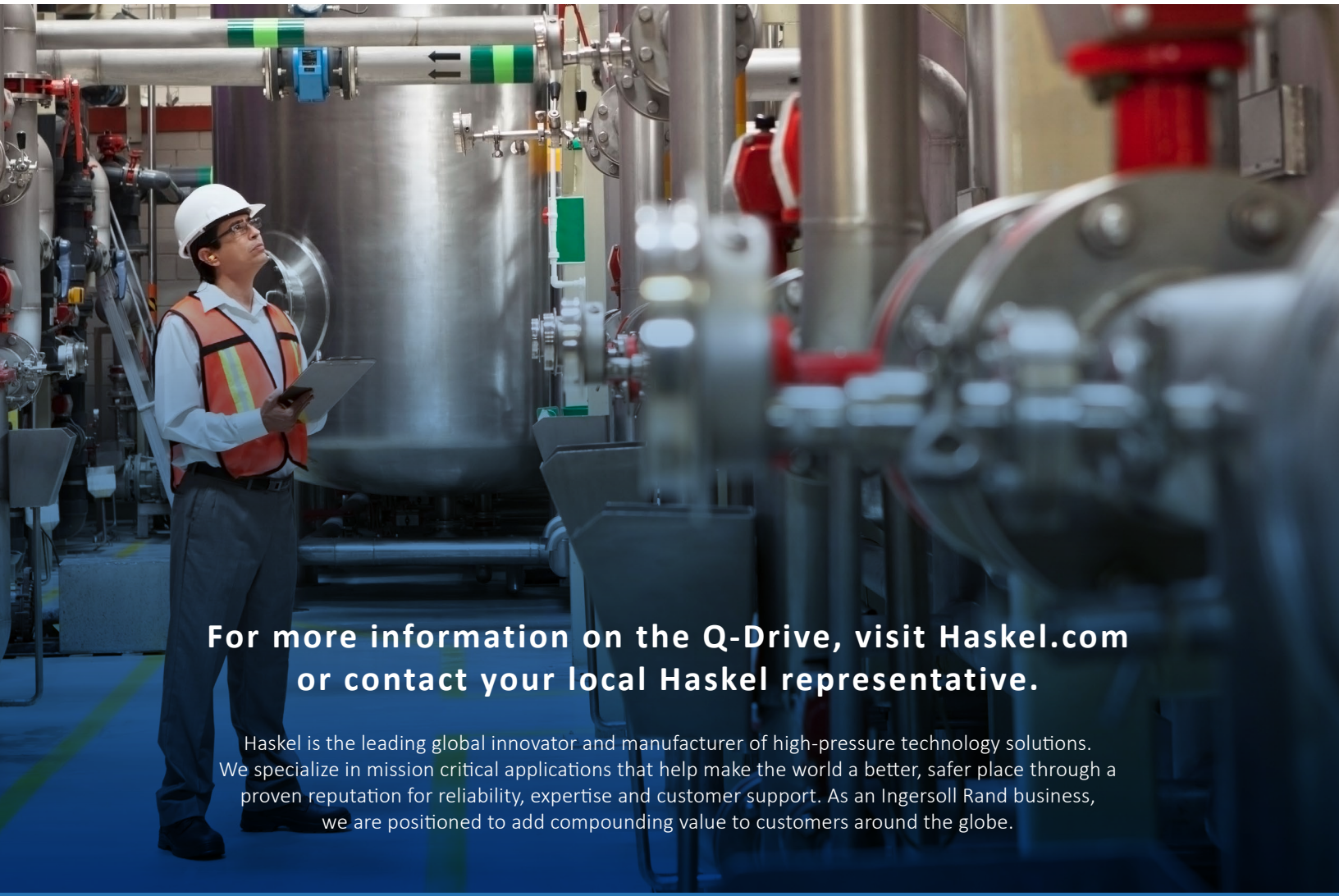

For more information on the Q-Drive, visit Haskel.com or contact your local Haskel representative.

Haskel is the leading global innovator and manufacturer of high-pressure technology solutions. We specialize in mission critical applications that help make the world a better, safer place through a proven reputation for reliability, expertise and customer support. As an Ingersoll Rand business, we are positioned to add compounding value to customers around the globe.

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