



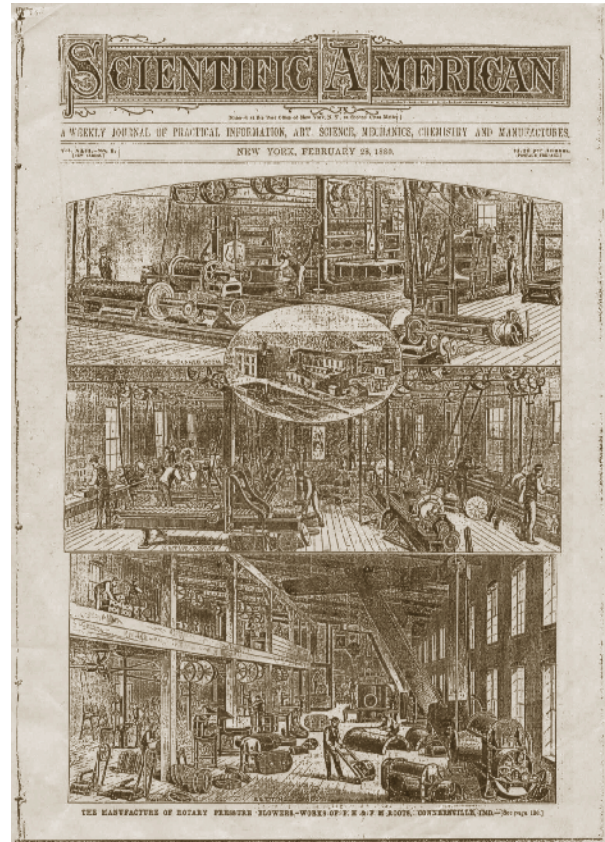
**The original ROOTS blower still leads the way.™**

# Dresser Roots

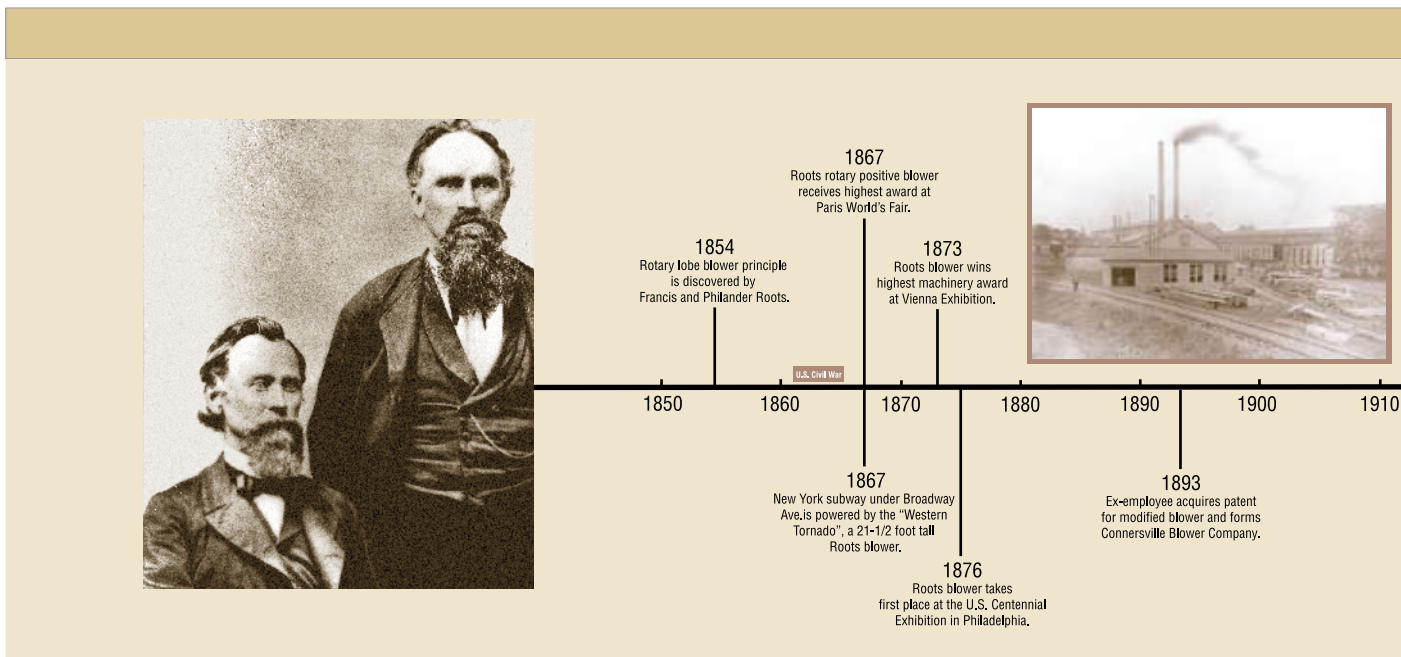
Dresser, Inc. is the longest continuously-run manufacturer of rotary positive displacement blowers in the United States. In 1854, Francis and Philander Roots, woolen mill owners in Connersville, Indiana, happened upon the principle that drives the rotary positive displacement concept.

Francis and Philander's attempts to improve efficiency in their mill's power system failed as the wooden lobed water wheel warped and jammed when put to use. In the course of investigating the problem on dry land, one of the brothers turned a shaft and rotated the pair of impellers. The impellers produced a large wind force blowing off his brother's hat. At that point, the brothers decided that they had a better blower than water wheel. Thus, the ROOTS™ blower concept and Roots Blower Company was created in their hometown of Connersville, Indiana, USA.

The rotary blower, invented around the same time as the telegraph and steam engine, has withstood the test of time as the other inventions have fallen along the wayside. During the early years, the units proved reliable as low-pressure air sources for everything from blacksmith forges, to mine ventilation, to powering the first New York City subway.



February 28, 1880 issue of Scientific American featured, as its cover story, "The Manufacture of Rotary Pressure Blowers - Works of P. H. & F. M. Roots, Connersville, Ind.".



In 1893, an engineer broke from the Roots Blower Company and started the Connersville Blower Company.

In the early 1900s Roots Blower Company invented a three-lobe blower to reduce pulses in the air flow. This engineering contribution would have its greatest impact nearly a century later as tri-lobe blowers were adopted for their quieter operation and reduced pulse.

The Roots Blower Company and the Connersville Blower Company continued in Connersville until 1931. At that time, the International Derrick and Equipment Company (IDECO) purchased both firms and created the Roots-Connersville Blower Company.

During 1931, Roots began to produce centrifugal compressors. Today, Roots manufactures integral-gear, and pedestal-mounted, overhung, single-stage centrifugal compressors, as well as horizontally-split, multi-stage centrifugal compressors.

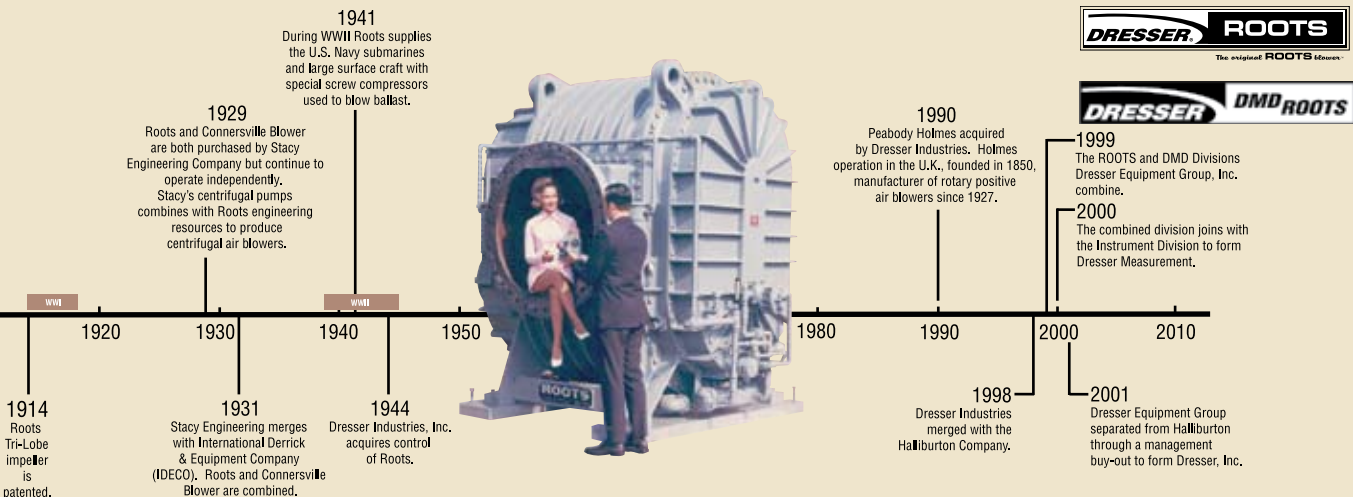
During WW II, Roots supplied Navy submarines and large surface craft with a special screw compressor used for ballast blowing.

In 1944, Dresser Industries, Inc. acquired Roots to expand its range of services for the gas and oil industries.

In 1990 Roots acquired Peabody Holmes and its plant in Huddersfield, England. The plant was founded in 1850 as W.C. Holmes Ltd. and began manufacturing rotary positive displacement air blowers in 1927. The Roots Huddersfield Operation handled European sales and manufacturing. In 2007 the operation moved to Skelmersdale in Lancashire.

During 1998, Dresser Industries merged with the Halliburton Company. In 1999, the Roots and DMD Division of Dresser Equipment Group, Inc. combined and in 2000 joined with the Instrument Division to form Dresser Measurement. During 2001, Dresser Equipment Group separated from Halliburton through a management buy-out to form Dresser, Inc.

In 2007 Roots acquired ESCOR Controls and integrated its water and wastewater controls expertise into the company's offerings and expanded the scope of the IntelliView® control systems.





## Universal RAI® Blower

Heavy-duty, bi-lobe rotary blowers in a compact, sturdy design engineered for continuous use with maximum reliability.

- Very cost effective design
- Pressures to 15 psig (1034 mbar)
- Vacuums to 16" Hg (539 mbar)
- Flows to 2370 cfm (4026 m<sup>3</sup>/hr)
- Available with metric drive shaft and pipe connections



## Universal RAI® DSL Blower

This model features dual splash lubrication on both the gear end and drive end. Dual Splash Lube provides:

- More oil capacity
- Cooler operation
- Greater reliability
- Available with metric drive shaft and pipe connections



## Universal RAI-J™ Blower

Incorporates ROOTS™ WHISPAIR™ technology to reduce noise levels 3-5 dBA.

## Universal RAI-G™ Blower

This model features mechanical seals that virtually eliminate leakage.

- 1/8" (0.3137 cm) NPT purge port for buffer gas applications



## Universal RAI-J™ DSL Blower

DSL features are incorporated into the Universal RAI-J™ model for longest life and quietest performance.

- All of the Universal RAI® family of blowers feature detachable feet, allowing you to mount the blower into your custom system



## RAM-J Blower

Incorporates ROOTS™ WHISPAIR™ technology to reduce noise levels.

- Pressure to 18 psig (1240 mbar)
- Vacuum to 16" Hg (539 mbar)
- Flows to 3550 cfm (6030 m<sup>3</sup>/hr)

## RAM-GJ Blower

Standard gas blowers suitable for both vacuum and pressure service. Features a piston ring system between the compression and vent cavities

- Long life mechanical seals offer superior protection and containment



## RAM-VJ Blower

RAM™ WHISPAIR™ units are available with an inlet spray nozzle and seal water flow meter for water injection. This water cools the vacuum unit to enable it to reach deeper vacuum.

- Vacuum to 24" Hg (813 mbar)
- Flows to 2500 cfm (4250 m<sup>3</sup>/hr)



### RAM-DPJ Blower

This RAM™ WHISPAIR™, dry, high-pressure blower features an exclusive discharge jet plenum to allow externally cooled gas to flow into the casing and the Whispair™ jets control pressure equalization.

- Pressure to 30 psig (2068 mbar)
- Flows to 520 cfm (885 m<sup>3</sup>/hr)



### RAM-DVJ Exhauster

This dry exhauster features an exclusive jet plenum designed to allow cool, atmospheric air to flow into the casing. This design allows continuous operation at levels to blank-off with a single stage unit.

- Vacuum to 27" Hg (910 mbar)
- Flows to 2400 cfm (4077 m<sup>3</sup>/hr)



### ROOTS-FLO® Blower

This heavy duty rotary unit is a compact design engineered for reliable pneumatic conveying of grain and similar products.

- Vacuums to 16" Hg (539 mbar)
- Pressure to 15 psig (1034 mbar)
- This unit is your drop in replacement solution



### 2504 DVJ WHISPAIR™ Exhauster

This WHISPAIR™ dry vacuum exhauster has an exclusive discharge jet plenum design which allows cool, atmospheric air to flow into the cylinder.

- Unique design permits continuous operation at vacuum levels to 20" Hg (675 mbar) with a single stage unit.



### RCS 800 Blower

Piston rings reduce air leakage while lip-type oil seals prevent lubricant from entering the air chamber.

- Pressures to 18 psig (1241 mbar)
- Vacuums to 16" Hg (539 mbar)
- Flows to 6300 cfm (10710 m<sup>3</sup>/hr)



### RCS-VJ Exhauster

RCS WHISPAIR™ units are available with an inlet spray nozzle and seal water flow meter for water injection. This feature cools the vacuum unit to enable it to reach deeper vacuum.

- Vacuums to 24" Hg (810 mbar)
- Flows to 4080 cfm (6930 m<sup>3</sup>/hr)

### RCS-J Blower

Incorporates ROOTS™ WHISPAIR™ technology to reduce noise levels.

- Industrial Standard
- Flows to 5610 cfm (9530 m<sup>3</sup>/hr)



## DVJ WHISPAIR™ Exhauster

These blowers have an exclusive WHISPAIR™ discharge jet plenum design which allows cool, atmospheric air to flow into the cylinder. This unique design permits continuous operation at vacuum levels to blank-off with a single stage unit, without water injection. The DVJ's cooling design eliminates the problems caused by high discharge temperatures at vacuum levels beyond 16" Hg.

- Flows to 16870 cfm (28662 m<sup>3</sup>/hr)
- Vacuums to 27" Hg (910 mbar)



## TRI-NADO® TM Exhauster

This unit's tri-lobe design results in high efficiency and reduces in-pipe pulsation and noise levels. Incorporates ROOTS™ Whispair™ technology to further reduce noise levels.

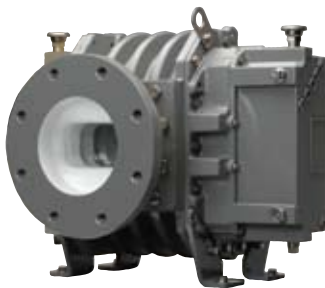
- Flows to 5760 cfm (9790 m<sup>3</sup>/hr)
- Single-stage vacuums to 28" Hg (945 mbar)



## RBTM Blower

A rotary positive blower designed for use in truck-mounted applications, though it can be used in stationary applications with an electric motor. Available in three sizes offering a wide range of capabilities.

- Flows 1535 cfm (2611 m<sup>3</sup>/hr)
- Pressure to 18 psig (1241 mbar)
- Vacuums to 14" Hg (472 mbar)



## RAM X™ Tri-Lobe Blower

The blowers feature ROOTS™ WHISPAIR™ discharge design which, when combined with our tri-lobe impellers, delivers quieter operation than conventional tri-lobe blowers.

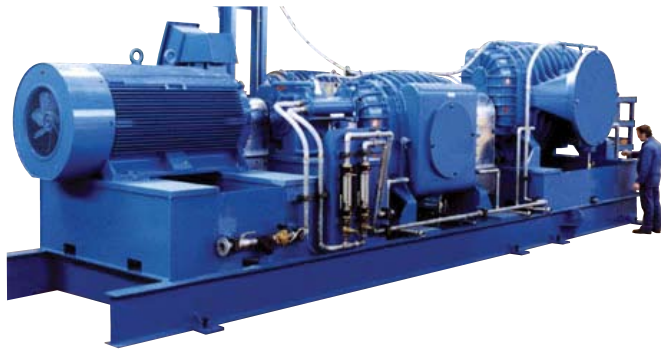
- Flows to 5900 cfm (10030 m<sup>3</sup>/hr)
- Vacuum to 16" Hg (539 mbar)
- Pressures to 15 psig (1034 mbar)



## EASYAIR® X2 Factory Blower Package System

The EASYAIR® X2 Factory Blower Package System is an improved design based upon the popular EASYAIR® 8000 package. The EASYAIR® X2 system provides performance engineering in a standard package. It is produced for vacuum or pressure applications, enabling simple, on-site installation.

- Overall size is smaller than the EASYAIR® 8000 package and the side-to-side size accommodates more packages in a given area
- No electric fan hookup required as the fan is mounted on the blower shaft and driven mechanically resulting in superior cooling
- Patented automatic belt tension system optimizes performance and extends belt life
- Panel-mounted gauges (inlet filter differential, blower exhaust temperature and pressure) and external oil level view for easy monitoring
- Up to 22dBA free field noise attenuation with enclosure



## VJ/VJ2 Blower

Water injected, air or gas blower features ROOTS™ WHISPAIR™ plenum with 3-5 dBA quieter operation.

### Single stage

- Vacuum to 24" Hg (810 mbar)

### Two stage

- Vacuum to 27" Hg (910 mbar)
- Flows to 43200 cfm (72440 m<sup>3</sup>/hr)
- Two stage reduces power 25%



## RAS-J Blower

Air blower that is available with splash lubrication or true pressure lubrication. Features a WHISPAIR™ plenum with 3-5 dBA quieter operation.

- Pressure to 35 psig (2413 mbar)
- Vacuum to 16" Hg (539 mbar)
- Flows to 43200 cfm (73440 m<sup>3</sup>/hr)



## RAS-J Forty PSL Blower

Extended flow range and efficiency with the advantage of the WHISPAIR™ plenum

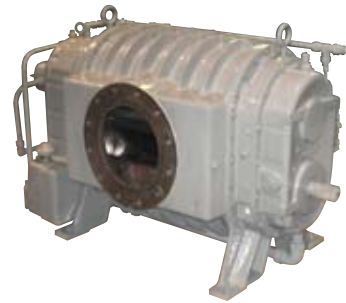
- Up to 82% increase in pressure rise capacity
- Direct connect to 50Hz and 60Hz motors provides the largest flow range possible without gear-reducers
- Available with true pressure lubrication
- Mechanical seals are also available for your unique gas



## RGS-J Blower

Heavy-duty gas blowers designed for continuous service. An exclusive wrap-around plenum and WHISPAIR™ jet eliminate rapid backflow of gas into the blower from the discharge area.

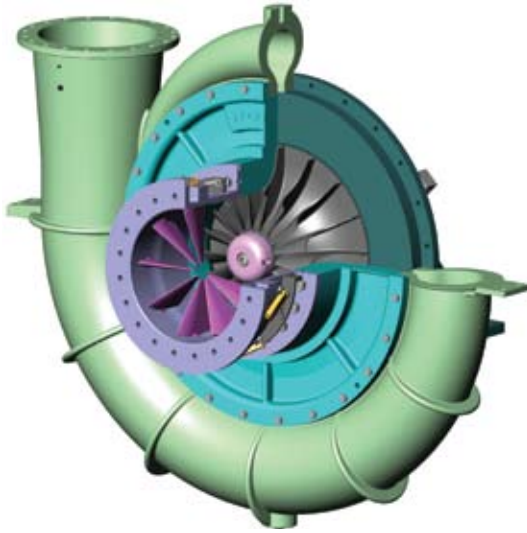
- Pressure to 35 psig (2413 mbar)
- Vacuum to 16" Hg (542 mbar)
- Flows to 43200 cfm (73440 m<sup>3</sup>/hr)



## RGS-HVB Blower

Designed for applications to the single digit micron range when used in series with a backing pump.

- Steel Degassing
- Laser Booster
- Altitude Chamber

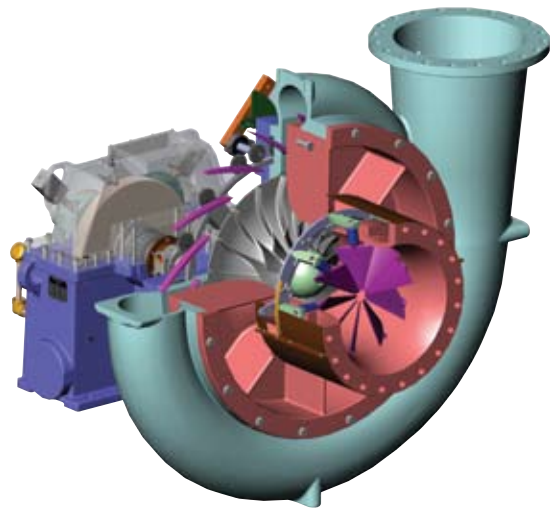


### Type OIB Centrifugal Compressor

This compressor features a stiff shaft design which assures an operating speed well below the first critical speed of the shaft.

A wide range of stable operation is provided by these units with surge occurring at approximately 50% of design capacity. Use of adjustable inlet guide vanes can extend this to 30% of design capacity or 70% turndown.

- Polytropic heads to 40,000 ft.
- Flows from 300,000 cfm (510,000 m<sup>3</sup>/hr)



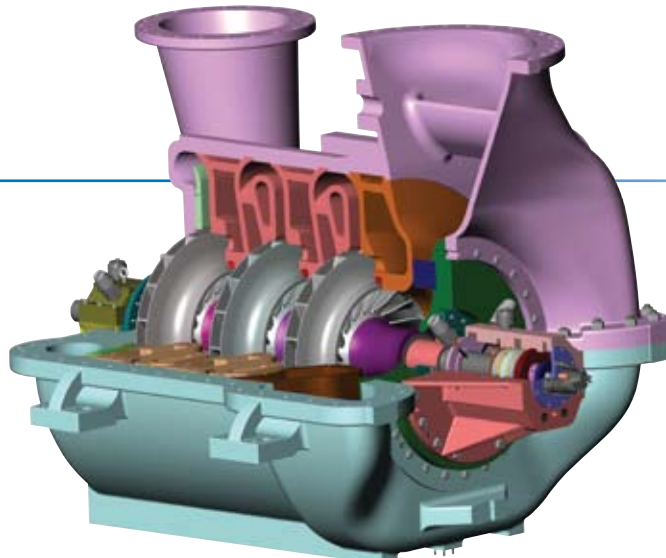
### Type IGC Centrifugal Compressor

This compressor is suitable for use with a variety of constant speed or variable speed drivers. Local energy costs and your requirements will determine the most economical method of drive for your application.

Adjustable inlet guide vanes control the capacity with a minimum loss of efficiency, and also increase the stable operating range.

Adjustable diffuser vanes are available for certain applications where constant inlet temperature exists and constant discharge pressure is desired.

- Polytropic heads to 50,000 ft.
- Flows to 60,000 cfm (101,949 m<sup>3</sup>/hr)

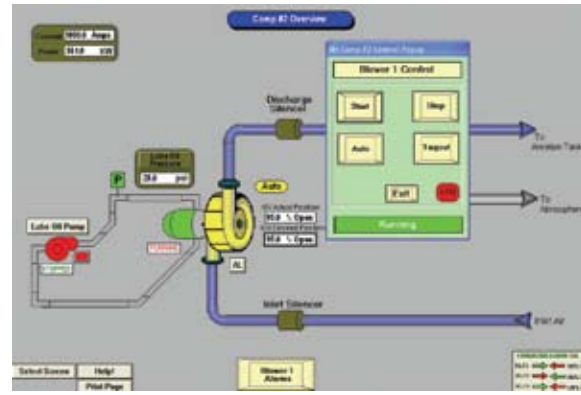
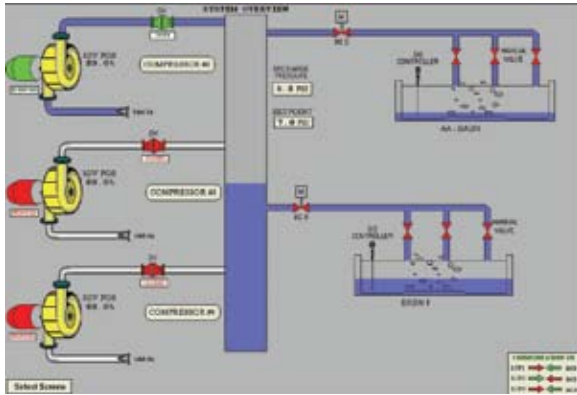


### Type H - Multi-Stage Centrifugal Compressor

A choice of impeller materials provides efficient, reliable operation with a variety of process gases at varying temperatures, humidity levels and pressures. Horizontally-split casing compressors feature bearing housings that are flange mounted to the case. This design permits easy access for maintenance or bearing inspection.

- Polytropic heads to 90,000 ft.
- Flows from 9,000 to 125,000 cfm (15,291 to 212,376 m<sup>3</sup>/hr)





Roots' control solutions for your aeration process are state-of-the-art assuring your plant optimum Dissolved Oxygen (DO) with minimal energy consumption.

# Controls and Services

## Energy Savings

- Save 25% to 40% compared to manual control
- Reduce Consumption and Demand Charges
- Assistance in Obtaining Utility Rebates
- Most Open Valve Control
- Minimize System Pressure
- Coordinate Aeration Demand and Blower Supply Air Flows

## Direct Flow Control

- Eliminate Pressure Control Loops
- Simplified Tuning
- Increased Stability
- Reduce Energy Consumption 5% to 10%

## Variable Speed Control

- Positive Displacement Blowers
- Multistage Centrifugal Blowers
- Single Stage Centrifugal Blowers
- Combine with Variable Diffuser Vanes for Optimum Efficiency

## Direct Valve Position Control

- Eliminate 4-20 mA Positioners
- Reduce Equipment and Wiring Costs
- Reduce Calibration and Maintenance

## Application Engineering

- Design Assistance
- Analysis of Existing Operations
- Savings Calculations
- Simple and Complex Processes
- Single Basin, Multiple Basin, and Individual Grid Control

## Service Contracts

- Preventive Maintenance
- System Monitoring and Tuning
- On Site Field Service

## Energy Reduction Opportunities

- Integrated Aeration Systems
- Aeration Process and Blower Control
- Blower Control and Protection
- Communications with SCADA Systems
- Revamp
- Blower Optimization and Rebuilds
- Use Existing Controllers and Field Devices
- Upgrade Existing Control Logic Wastewater OEM's
- Blower and Control Packages
- Integrate with OEM Processes

## Technology Options:

- IntelliView® Process Controller
- PLCs (various)
- Direct Flow Control
- Dissolved Oxygen (DO)
- Most Open Valve (MOV)
- Pressure Control
- Direct Valve Control
- Best Application Specific Control Algorithms
- Variable Speed Control



### **Reduce Power Costs**

Your current aeration blower system may be the biggest single opportunity to reduce your power overhead.

When installed, your aeration blowers were matched for best efficiency at the original performance conditions. Times change, conditions change. Roots Revamp Services looks at today's and projected future conditions to analyze and establish updated best performance requirements for the blowers and complete aeration control – for example a 10 psig blower running at 8 psig uses 6% more power than a blower designed for 8 psig.

### **Global Aftermarket Coverage**

Roots maintenance and repair services provide professional methods and procedures that restore proper functionality and performance to each repaired unit. Access to Roots factory repair and service is available around the world, see the back cover for your nearest location. Service for small rotary blowers is available through our network of authorized distributor repair centers which can be searched on our website. All authorized repair centers use authentic ROOTS™ parts to assure warranty compliance.

### **Unmatched Experience**

We have extensive experience in the repair and maintenance of all brands of vacuum blowers and exhausters, blowers, and centrifugal compressors. Our capabilities allow us to repair or remanufacture all of your equipment to original or higher specifications. Roots provides full service and repair on all brands.

### **Superior Field Services**

- Full job-site troubleshooting services and capabilities
- State-of-the-art diagnostic tools delivered and utilized on-site for thorough diagnosis prior to removal
- 24-hour delivery for most parts and repair kits

### **Strongest Service and Repair Warranties in the Business**

Roots backs all maintenance and repair work performed at Roots facilities or in the field.

- One year parts and workmanship including competitor's parts
- Competitive pricing
- ISO-9001 Certified-Houston, TX, & Connersville, IN



## About Dresser Roots

Dresser Roots, a major product brand of Dresser, Inc., is the manufacturer of the original ROOTS blower™, centrifugal compressors and control systems. ROOTS® air and gas moving equipment is used in a wide variety of applications, including Mechanical Vapor Recompression, water and wastewater treatment, flue gas desulphurization, petrochemical and chemical processes, conveying, and other industrial applications.

## About Dresser, Inc.

Dresser, Inc. is a leader in providing highly engineered infrastructure products for the global energy industry. The company has leading positions in a broad portfolio of products, including valves, actuators, meters, switches, regulators, piping products, natural gas-fueled engines, retail fuel dispensers and associated retail point-of-sale systems, and air and gas handling equipment. Leading brand names within the Dresser portfolio include Dresser Wayne® retail fueling systems, Waukesha® natural gas-fired engines, Masoneilan® control valves, Consolidated® pressure relief valves, and Roots® blowers. It has manufacturing and customer service facilities located strategically worldwide and a sales presence in more than 150 countries.

### Dresser Roots

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