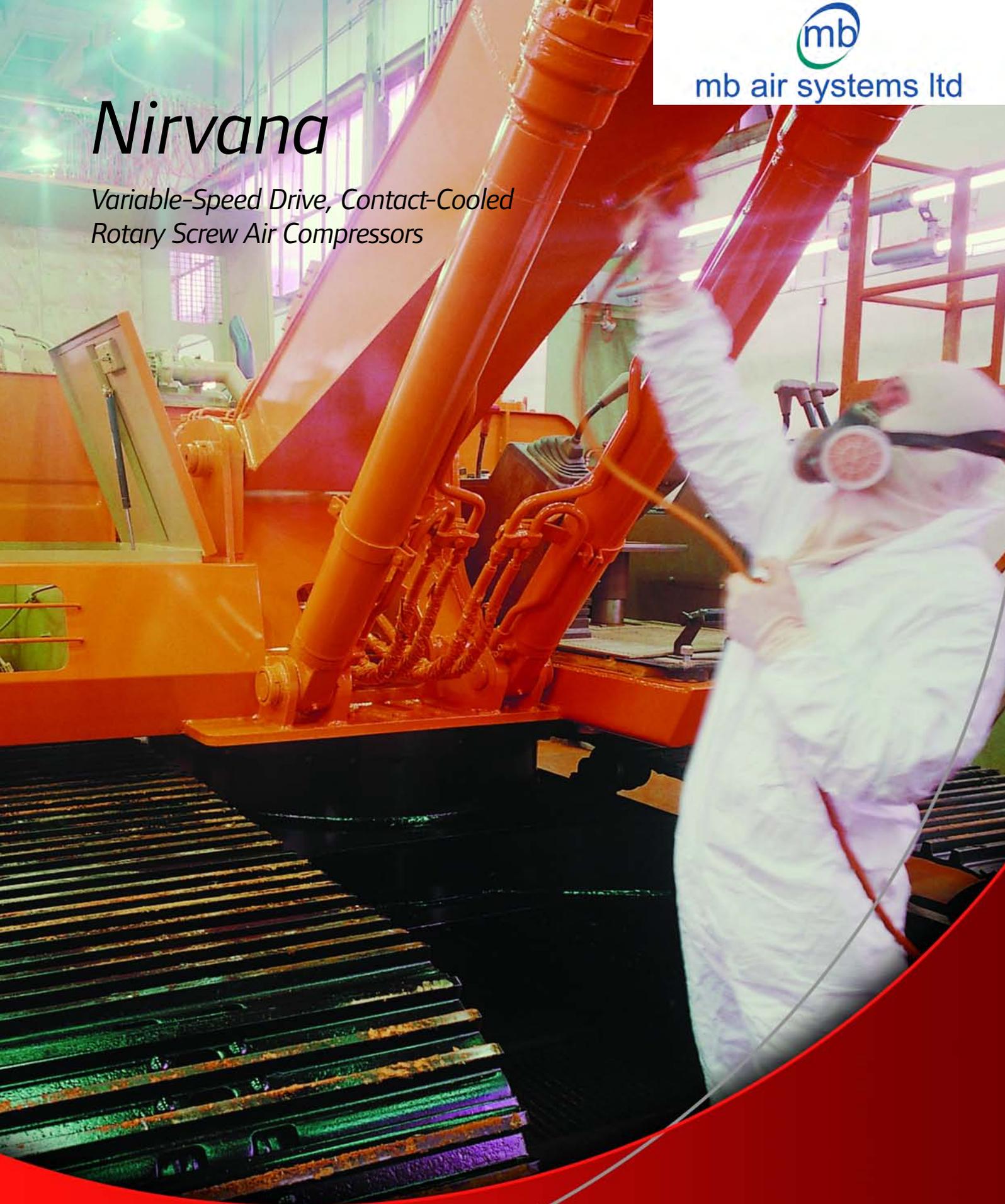




mb air systems Ltd

# Nirvana

*Variable-Speed Drive, Contact-Cooled  
Rotary Screw Air Compressors*



# Exceptional Reliability

## Introducing Nirvana- A True Variable-Speed Drive Compressor Now Available in Single- and Two-Stage.

By matching a standard variable-speed inverter with a Hybrid Permanent Magnet® (HPM®) motor, Ingersoll Rand is first-to-market with a true variable-speed drive compressor. In both single- and two-stage, the Nirvana compressor has fewer rotating parts than any other air compressor in its class.

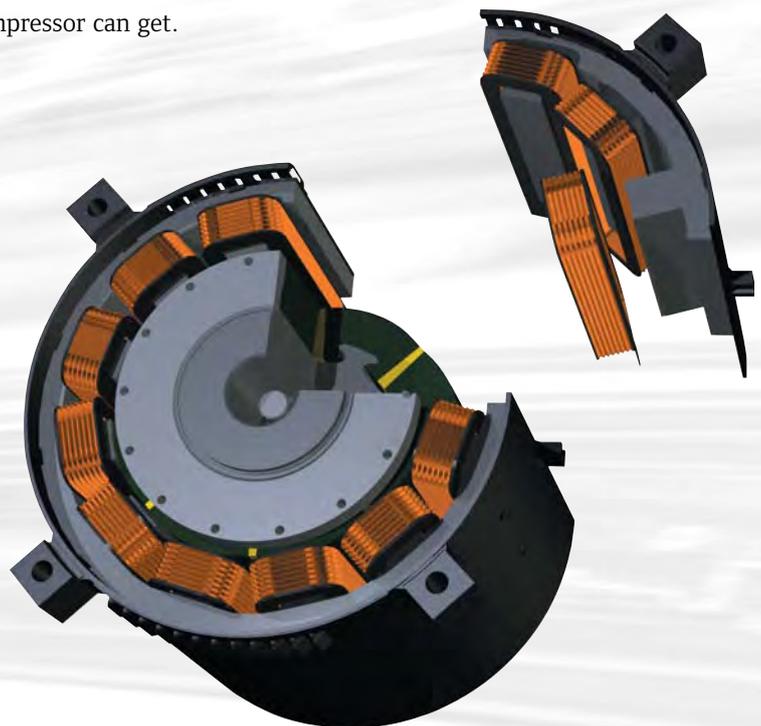
- HPM® motor has no bearings, thus raising the standard on compressor reliability to an unequalled level.
- Since the HPM® motor directly drives the compressor, there are no pulleys, belts, couplings or motor shaft seals that would wear out, leak or need replacing.
- Coupled with Ingersoll Rand's time-proven, reliable airend, Nirvana is as low-maintenance as an air compressor can get.

### Field-Replaceable Motor Stator Provides Dramatically Improved Uptime

Nirvana's contact-cooled high-efficiency HPM® motor has virtually no wearing parts. Should the motor be subjected to a catastrophic electrical surge or other electro-thermal event that damages one or more of the motor coils, the stator is quickly and easily replaced in the field by authorised technicians. The Nirvana stator exchange program provides–

- Quick, convenient turnaround;
- Less expense than a motor rewind.

The revolutionary Hybrid Permanent Magnet® motor has no bearings and virtually no wearing parts.

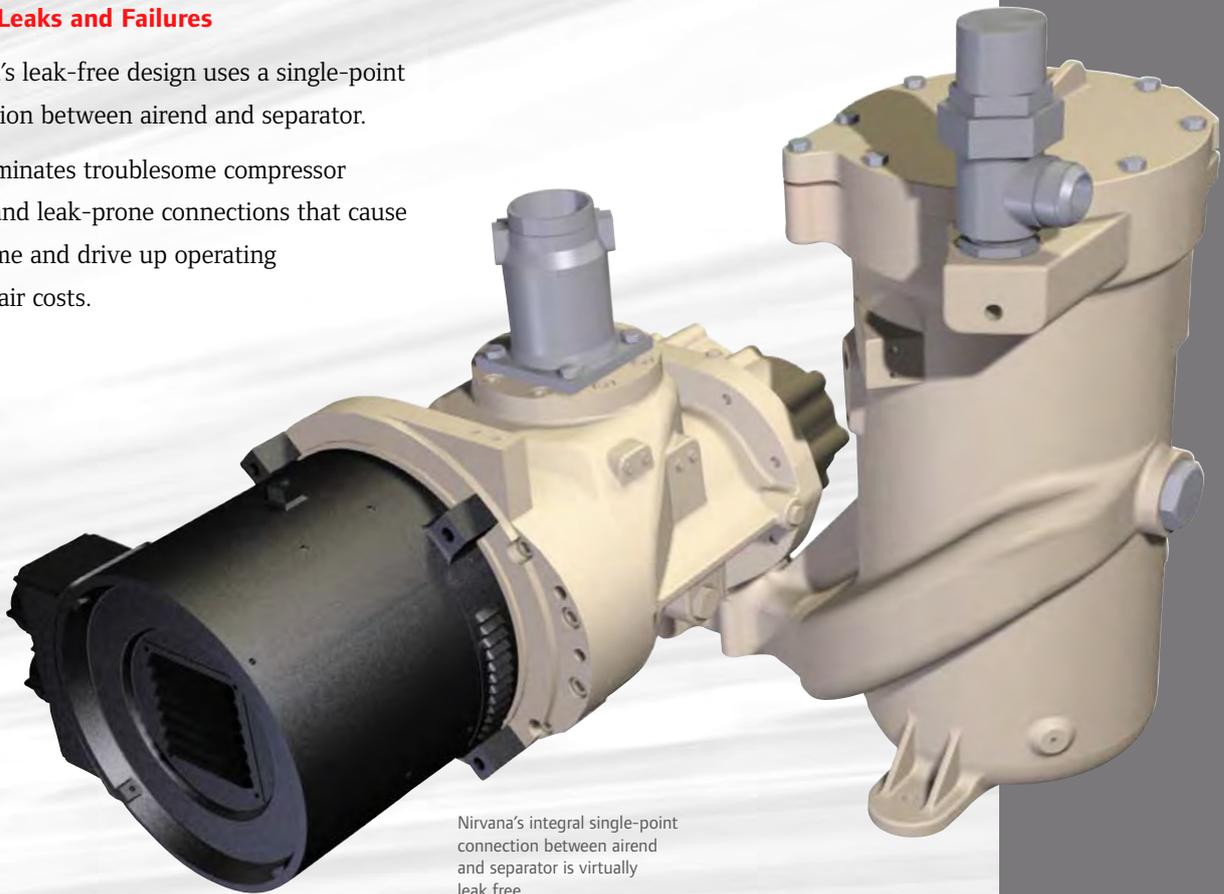


# Nirvana

**Integral Design, Fewer Parts and Fewer Connections Help Eliminate Trouble Spots, Leaks and Failures**

Nirvana's leak-free design uses a single-point connection between airend and separator.

This eliminates troublesome compressor piping and leak-prone connections that cause downtime and drive up operating and repair costs.

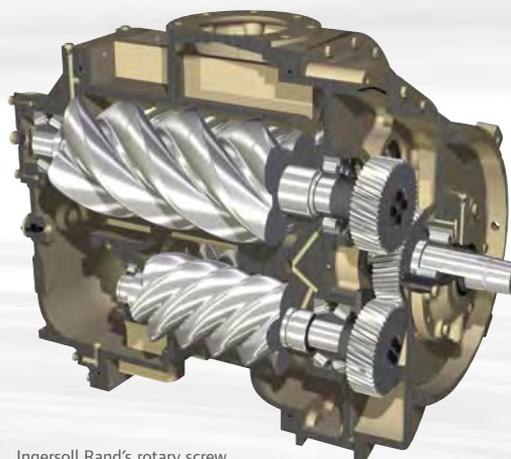


Nirvana's integral single-point connection between airend and separator is virtually leak free.

**Time-Proven Quality Airend and Inverter**

Not everything in the Nirvana compressor is brand new. At the core of all Nirvana compressors is Ingersoll Rand's rugged, reliable single- and two-stage airends.

- Ingersoll Rand's advanced airend design is known everywhere for trouble-free operation and minimal maintenance.
- The Variable Frequency Drive (VFD) uses a standard inverter that is well recognised for providing dependable service in manufacturing operations all over the world.



Ingersoll Rand's rotary screw airends are time-proven and known around the world for their matchless reliability.

# Energy Efficiency

Nirvana

## Nirvana. Maximum Efficiency at Virtually Any Load

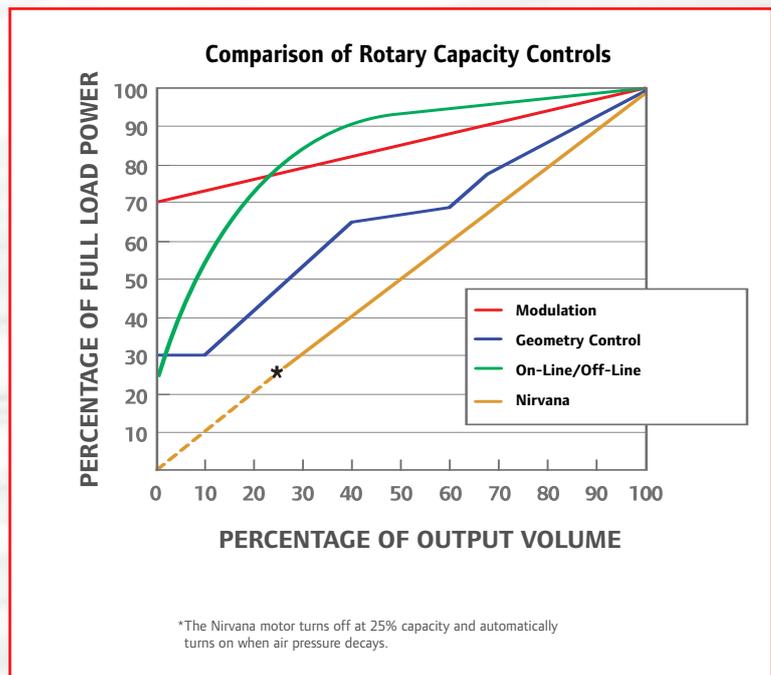
At full load, the new Nirvana compressor can produce the most air using the least energy. Ingersoll Rand will guarantee these efficiencies down to loads as low as 25%.

By comparison, a conventional fixed-speed air compressor can produce extreme pressure fluctuations, greatly reducing efficiency whenever the compressor operates outside its optimum performance range.

Using a frequency inverter and the HPM® motor, Nirvana compressors–

- Provide the only true variable-speed drive (VSD);
- Deliver air at a constant pressure, regardless of demand, at maximum efficiency;
- Achieve constant pressure and maximum efficiency across their entire operating range, from 100% loaded down to as little as 25% loaded.

Nirvana compressors deliver constant pressure and maximum efficiency at any capacity.

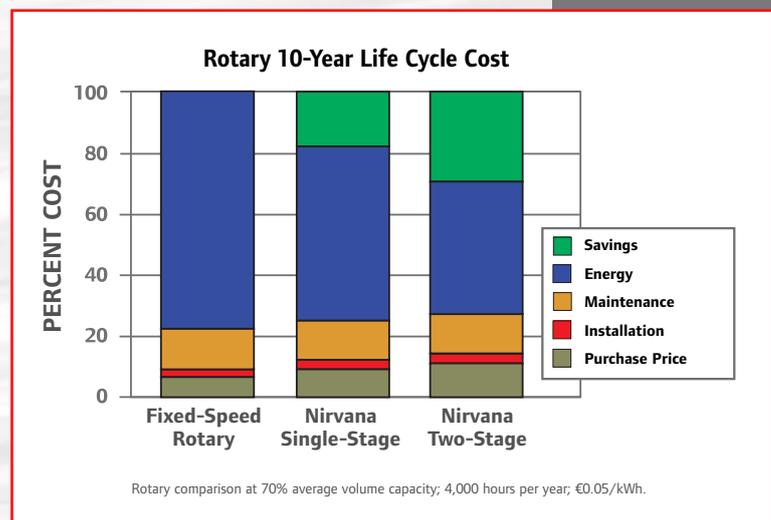


*Traditional purchase decision factors represent only 20% of the cost to own and operate a rotary screw compressor. Energy represents 80% of the life cycle cost. Only Nirvana will save at least 28% of the energy cost over its life.*

**Nirvana Will Reduce the Total Life Cycle Cost to Own and Operate an Air Compressor**

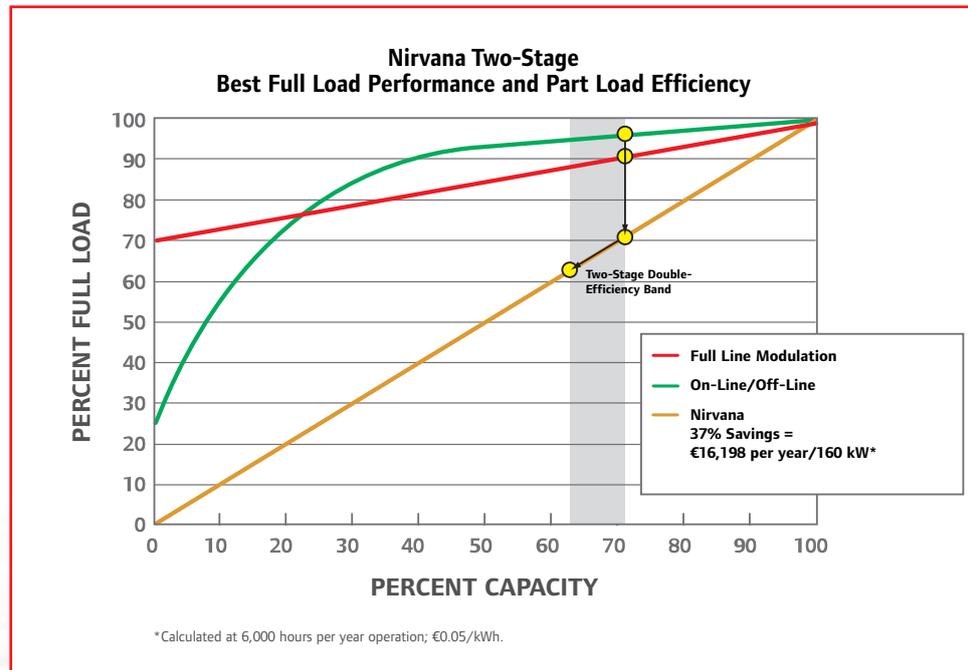
Ingersoll Rand's exclusive VSD makes possible a range of operating characteristics that produce this unequalled energy efficiency.

- In a conventional air compressor, starting up the drive motor creates an enormous energy draw, which can be as much as 800% of the full load normal running current. Nirvana's HPM® motor and drive system limits the in-rush current to less than 100%.
- The significant decrease in starting amp requirements minimises peak charges, leading to a lower energy bill.
- Unlike conventional on-line/off-line air compressors, the Nirvana sump does not blowdown. Instead, Nirvana compressors simply reduce speed and volume to meet demand.
- Rather than run unloaded, a Nirvana compressor simply shuts off.
- Nirvana compressors allow unlimited starts per hour with no decrease in motor life; therefore, energy savings are tremendous.



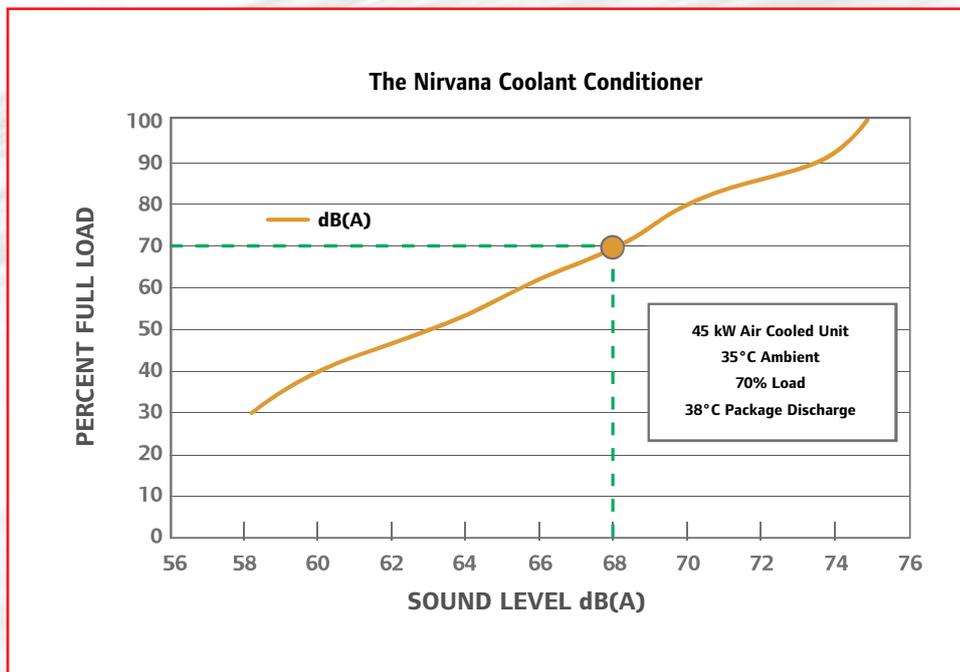
# Unequalled Performance

Nirvana



## Nirvana Two-Stage Beats the Performance of Any Other VFD Compressor at Full or Part Load

- The typical compressor operates at an average of 70% load.
- The Nirvana VSD decreases the overall energy cost 22%-30% compared to a fixed-speed rotary air compressor.
- The Nirvana two-stage produces approximately 11%-15% more air than a single-stage air compressor.
- Maximum energy saving is achieved by the Nirvana two-stage yielding 33%-41% savings.



**Nirvana's Coolant Conditioner Allows the Compressor to Run at Constant Package Discharge Temperature**

- The Nirvana Coolant Conditioner matches the performance of the cooling system to the performance of the compressor, maximises bearing life, lowers energy cost and keeps compressor noise levels to a whisper.
- Sound levels are as low as 59 dB(A) and 67 dB(A) at typical conditions.
- The VFD on the coolant circuit eliminates any chance of moisture gathering in the coolant system. Competitive variable-frequency drive compressors will have a buildup of moisture in the coolant at partial loads, shortening bearing life.
- Nirvana's Coolant Conditioner manages to the optimum compressor coolant temperature, depending on the system load and ambient conditions.

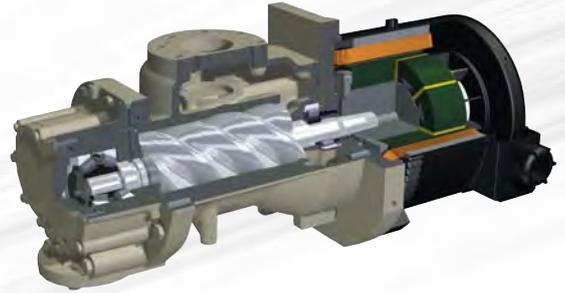
# Transcendent Technology

*Nirvana.*

*More air. Wider range. More efficient.*

Competitors attempt to achieve variable speeds using an inverter rigged to a conventional induction motor compressor drive train. But they end up using the same power to produce 10%-15% less air. Whether in single- or two-stage configuration, the double-efficient Nirvana compressors—

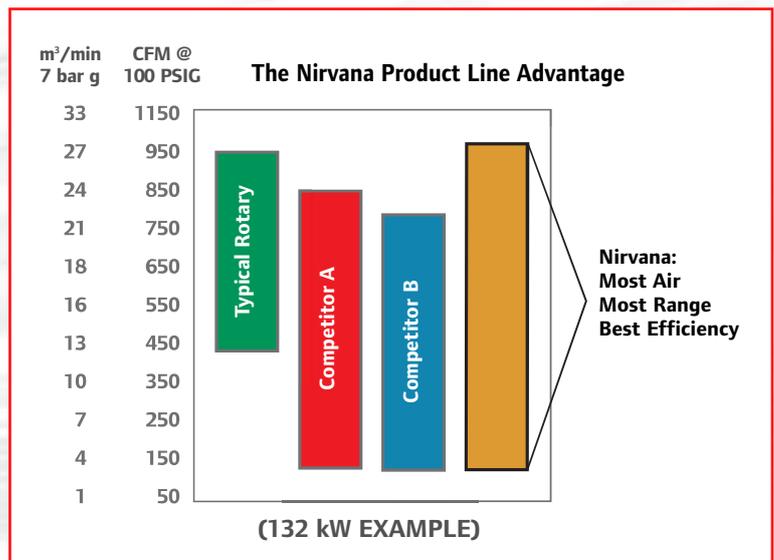
- Produce more air across a wider operating range with no increase in power consumption;
- Run at 95% efficiency at start-up vs. the competitions' 90%, and maintain 95% efficiency through the entire speed range.



Nirvana's more compact, doubly efficient single- and two-stage air end and HPM® motor assembly each deliver both increased capacity and greater efficiency.

Nirvana

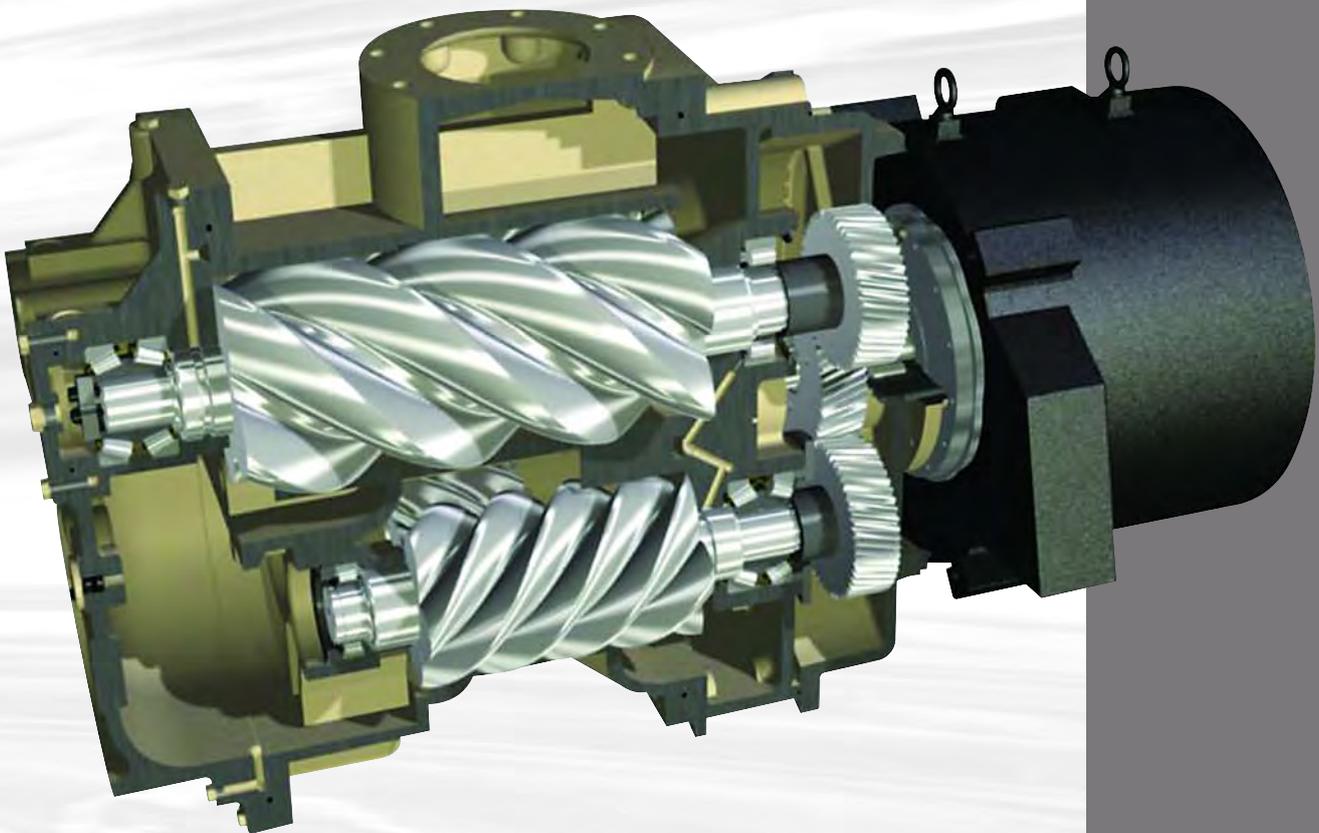
**The Nirvana Advantage.**  
Compared to both standard rotary screw compressors and other VFD units, Nirvana produces more air across a wider operating range, and always at maximum efficiency.



### Modular Drive

Nirvana features an all-new, compressor-specific modular drive designed with the latest technology, but using all standard components for easy repair and diagnosis.

- On-board drive diagnostics are displayed on the Intellisys™ microprocessor controller.
- Field-replaceable standard modular components eliminate costly VFD replacement.
- The patented modular drive can be diagnosed and serviced on-site by qualified Ingersoll Rand service personnel, eliminating valuable downtime.
- The drive is 60% smaller than standard frequency inverters.



# Nirvana Benefits

Nirvana

### One-Year Package Warranty

Nirvana features a one-year factory package warranty covering everything except periodic maintenance.

### Nirvana's Inherent Leak-Free Design

- Nirvana's cast iron separator tank joins the airend using an integral single-point connection.
- Ingersoll Rand has eliminated all external discharge piping and the check valve, making the Nirvana compressor virtually leak free.

### 46°C Ambient-Rated

- Ingersoll Rand's Nirvana compressors are designed to operate in high ambient conditions, making them ideal for locations anywhere in the world.



- Nirvana's high temperature rating ensures fewer nuisance shutdowns caused by fouled coolers.

### Frequency Inverter Drive

This advanced modular drive system gives the Nirvana compressor a controlled, soft start, eliminating current surges and extending component life for increased system reliability.





**8,000-Hour/Two-Year Lubricant**

Ingersoll Rand's UltraCoolant reduces maintenance costs by significantly extending coolant changeout intervals. Also, UltraCoolant's superior separating properties mean less coolant is passed downstream to the air system, resulting in cleaner air and minimal coolant costs.

**Easy Serviceability**

There are far fewer components needing servicing in Nirvana than in any other compressor. Thus, the Nirvana compressor package is remarkably uncluttered, with everything readily accessible behind easily removable panels.

**Factory-Tested**

Every Nirvana compressor undergoes rigorous computerized factory validation tests to ensure that Nirvana delivers its promised performance under a wide range of conditions.

**Variable-Speed Cooling**

- Elimination of thermal shock to cooling components reduces downtime.
- Consistent discharge temperature enhances system reliability.
- Energy consumption is matched to thermal load.

**Intellisys™ Microprocessor Controller Provides Total Control of Your Nirvana Compressor**

**At Your Fingertips**

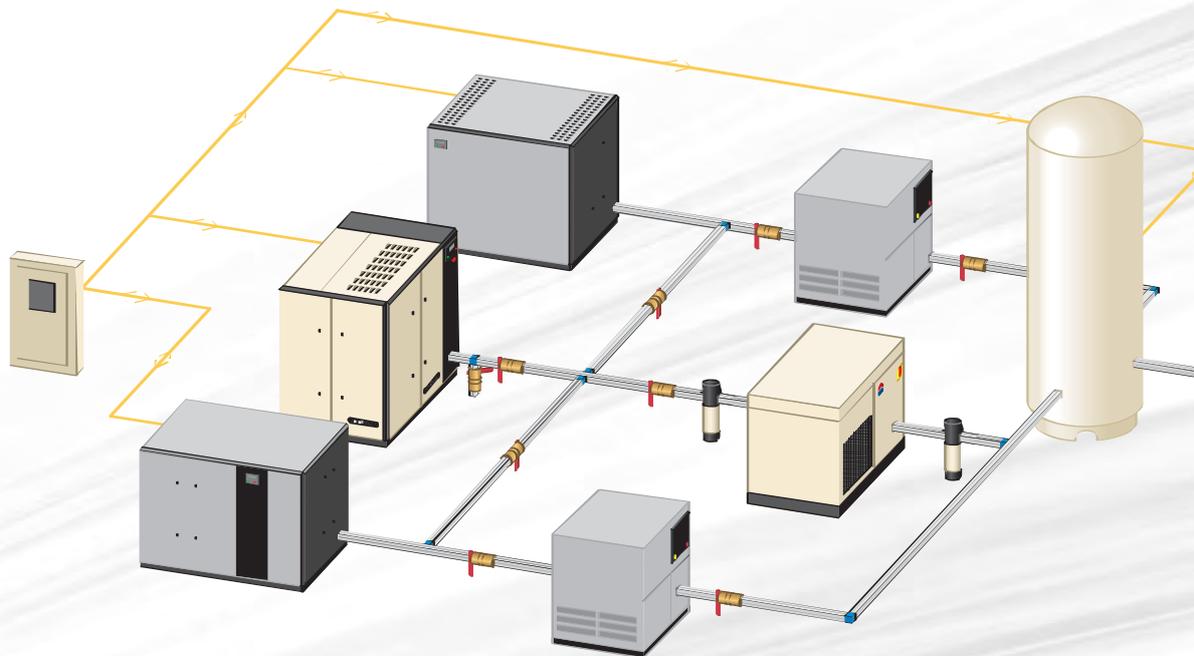
- With finger-touch control, the Intellisys™ controller provides quick, comprehensive access to your compressed air system. Nothing could be more intuitive and user friendly than the Intellisys™ controller.
- With the Intellisys™ controller, you are always in command. You can quickly and easily adjust the operating parameters of the Nirvana compressor to meet your plant air system's requirements and minimize operating costs.

**Timesaving Diagnostics**

- The Intellisys™ controller provides fast diagnosis of system demand, displays a warning and/or stops the compressor if it exceeds operating parameters, and provides a history of events leading up to the condition. This will keep troubleshooting expenses and downtime to a minimum.
- An easy-to-read liquid crystal display provides you with the critical details of your Nirvana compressor's operation, allowing you to make fast adjustments when necessary.

Whether your application requires eight hours of continuous-duty compressed air or an intermittent supply over a 24-hour period, the Intellisys™ microprocessor controller puts you in complete control.

# Add Unequalled Reliability, Efficiency and Productivity to Your Current System

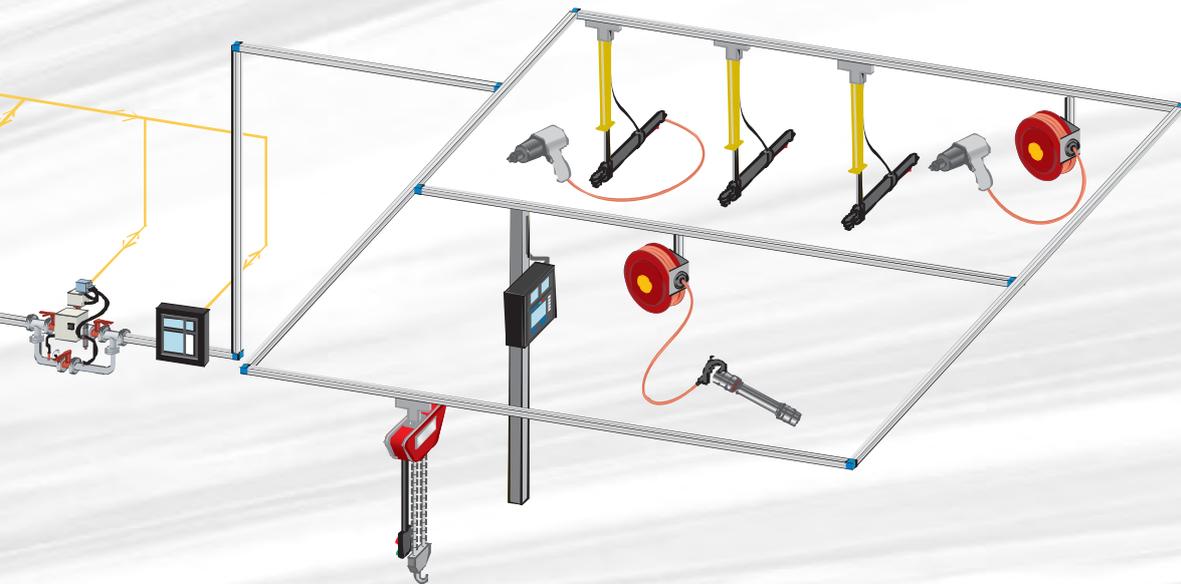


*Ingersoll Rand's Solutionizing™ process will save 25%-50% of the operating cost associated with the compressed air system.*

## **Reliability**

In a compressed air system, nothing is more critical than reliability. And no compressor is more reliable than Nirvana.

- Coupling superior compressor design for reliability with the exclusive Ingersoll Rand Solutionizing™ process often will turn off a compressor in the average compressed air system.
- Off compressors mean a significant increase in system reliability and integrity.



### Productivity

When compressed air is an important part of the production process, the compressed air system becomes especially critical in terms of productivity and cost efficiency.

- Adding a Nirvana compressor to your system not only reduces costs, but also makes your entire system more efficient and more productive.
- One of the primary goals of the Ingersoll Rand Solutionizing™ process is to provide stable, reliable pressure. Stable pressure, available when the production process needs it, will improve operating efficiency.

### Efficiency

The compressed air system uses 10% of the energy consumed by the average plant or production facility. Even small improvements in efficiency can be valuable.

- The variable-speed Nirvana compressor is the most efficient compressor ever built, resulting in major energy savings.
- Ingersoll Rand Solutionizing™ also seeks out the energy-wasting processes on the demand side and the supply side. Managing your compressed air system as a whole will lower operating costs.

# Ingersoll Rand Industry Classifications

Nirvana

Class	Description	Applications	
<b>IN1</b> Instrument Grade Air: ISO Class 2.1.1	Efficient removal of solid particulates and oil. ISO Class 1 Pressure Dewpoint will be maintained.	Instrumentation, process, oil and gas, chemical, electronics.	
<b>IN1 Odour-Free</b> Instrument Grade Air: ISO Class 2.1.1 odour free	Efficient removal of solid particulates and oil, and oil vapour. ISO Class 1 Pressure Dewpoint will be maintained.	Pharmaceutical, food and beverage, clean rooms.	
<b>IN2</b> Instrument Grade Air: ISO Class 2.2.1	Efficient removal of solid particulates and oil. ISO Class 2 Pressure Dewpoint will be maintained.	Instrumentation, process, oil and gas, chemical, electronics.	
<b>IN2 Odour Free</b> Instrument Grade Air: ISO Class 2.2.1 odour free	Efficient removal of solid particulates and oil, and oil vapour. ISO Class 2 Pressure Dewpoint will be maintained.	Pharmaceutical, food and beverage, clean rooms.	
<b>IG4</b> Industrial Grade Air: ISO Class 2.4.1	Efficient removal of solid particulates and oil. ISO Class 4 Pressure Dewpoint or a 30% (or less) Relative Humidity (RH) will be maintained.	General manufacturing, metal stamping, air tool use, forging, assembly, painting and finishing.	
<b>IG4 Odour Free</b> Industrial Grade Air: ISO 2.4.1 odour free	Efficient removal of solid particulates and oil, and oil vapour. ISO Class 4 Pressure Dewpoint or a 30% (or less) Relative Humidity (RH) will be maintained.	Food and beverage, raw material mixing.	
<b>IG6</b> Industrial Grade Air: ISO 2.6.1	Efficient removal of solid particulates and oil. ISO Class 6 Pressure Dewpoint or a 50% (or less) Relative Humidity (RH) will be maintained.	Sand blasting, home use, construction.	

# Symptom ... diagnosis ... prescription

## Ingersoll Rand can improve the health of your air system

A doctor wouldn't write a prescription without first making a diagnosis. Similarly, in terms of compressed air, fixing a troublesome system without first diagnosing the true problem is a hit or miss proposition based on guesswork. This can lead to production stoppages, extended downtime, and even product spoilage. Ingersoll Rand eliminates the guesswork by providing proven air system auditing services that not only ensure air system efficiency, but reduce operating costs to improve bottom lines.

Using an innovative tool — known as Intellisurvey — we non-intrusively monitor a compressed air system to determine the root causes of symptoms. With Intellisurvey, our experts analyse the many components

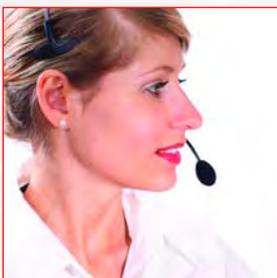
of an air system, as well as flow, pressure, supply utilisation, and power costs, to determine an optimised system that generates improvements in repeatability, efficiency, and plant productivity.



## UltraCare.....helping you to maintain a healthy business

A lot can (and will,) happen in the life of a compressed air system. With ever increasing demands for machine availability in today's industries, reducing production losses due to unplanned maintenance and downtime is essential.

That is why we offer UltraCare. A responsive, flexible, preventative maintenance program, designed to provide Ingersoll Rand authorised maintenance to ensure increased system reliability. UltraCare helps to eliminate unexpected downtime and costly repairs.





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