

# ESP 20/20

Complete System Solutions



Experience Proven Results™

# ESP 20/20 Compressor Monitoring System



At the customer's discretion, the manufacturer can view compressor performance or be notified of compressor advisories.

ESP 20/20 uses the latest in wireless technology to put the compressor in immediate contact with the appropriate people in the most expedient manner.



The compressed air expert can view compressor performance remotely and is immediately notified of advisories.

Educated decisions can be made on maintenance intervals and multiple site visits for repair services eliminated.

Opportunity for proactive repairs and operating training can be identified.

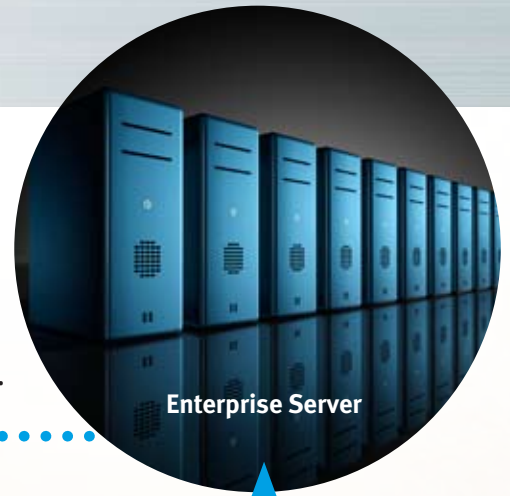
Response time to advisories and faults is reduced.





Information you need to manage your equipment at the convenience of your office.

Multiple compressor assets at multiple locations can be accessed through a single web-based interface.



Enterprise Server

Compressor vitals are relayed by wireless connection to the web application where they can be accessed 24/7.



The result: your compressors are kept operating in the most productive and efficient manner.



## Priority One



### Keep your equipment running and maximize profit

ESP 20/20 constantly monitors the compressed air assets and automatically communicates to the compressed air expert without utilizing valuable personnel. Focus remains on productivity and profitability, making sure a quality product or service is successfully delivered on time.

### Identify and resolve problems before failures occur

Critical operational information and advisories within the compressor are pro-actively communicated in real-time so that pre-emptive or repair action can be taken. Small problems are resolved before they become big ones that result in downtime or catastrophic failures.

**ESP 20/20**  
Compressor Monitoring System

Enterprise Status  
Enterprise Name  
Site Name  
Product Family  
Department Name  
Data Table  
Data Length  
Refresh  
Logout

Enterprise Status - Enterprise Status

Search & Filter

Display: 10  
Refresh: 10  
Filter: All  
Sort: Name

Name	Description	Location	Status	Alerting	Unit	Value	Unit	Alert
Compressor_01	Compressor_01	01-01-01	OK	OK	100	100	100	OK
Compressor_02	Compressor_02	01-01-02	OK	OK	100	100	100	OK
Compressor_03	Compressor_03	01-01-03	OK	OK	100	100	100	OK
Compressor_04	Compressor_04	01-01-04	OK	OK	100	100	100	OK
Compressor_05	Compressor_05	01-01-05	OK	OK	100	100	100	OK
Compressor_06	Compressor_06	01-01-06	OK	OK	100	100	100	OK
Compressor_07	Compressor_07	01-01-07	OK	OK	100	100	100	OK
Compressor_08	Compressor_08	01-01-08	OK	OK	100	100	100	OK
Compressor_09	Compressor_09	01-01-09	OK	OK	100	100	100	OK
Compressor_10	Compressor_10	01-01-10	OK	OK	100	100	100	OK

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Configuration

Item	Value	Unit	Alert
Compressor_01	100	%	OK
Compressor_02	100	%	OK
Compressor_03	100	%	OK
Compressor_04	100	%	OK
Compressor_05	100	%	OK
Compressor_06	100	%	OK
Compressor_07	100	%	OK
Compressor_08	100	%	OK
Compressor_09	100	%	OK
Compressor_10	100	%	OK

typical over temp alert

# Maximize Your Uptime

## Immediate notification of advisories and shutdowns

Utilizing the latest in wireless technology, ESP 20/20 provides alarms via email, text, page , or voice putting the compressor in direct touch with the appropriate service personnel in the most expedient manner.



typical alert text message

## Avoid maintenance downtime and delays

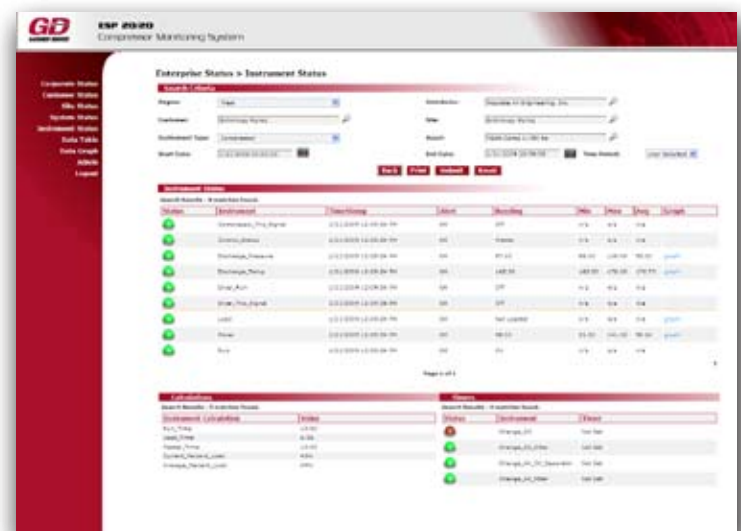
Remote access to key performance parameters and advisories allow decisions to be made on equipment and part requirements without being on site, eliminating multiple compressor visit and delays.

Access to this information 24/7 provides input on maintenance intervals and identifies opportunities for operator training.

## Increase long term reliability and maximize performance

Graphing and export tools provided by ESP 20/20 allow key information over preset or user selectable periods of time to be analyzed. Trends can be identified to track compressor performance and isolate problem areas that occur intermittently or at specific points in time.

Historical performance from previous days, months, and even years can be compared to a compressor's current operation and performance. Evaluation of this information creates a better cared for asset, resulting in optimal operation with increased reliability, availability and efficiency.



typical maintenance advisory



typical time period graph

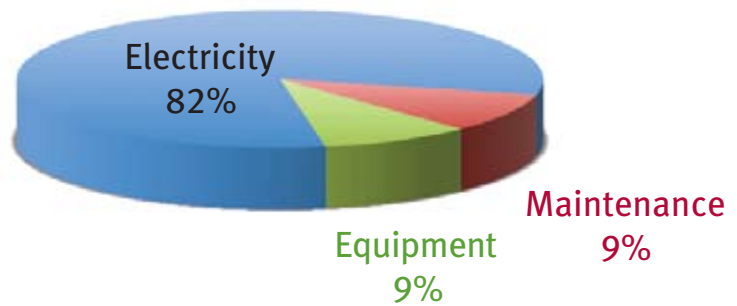
## ESP 20/20 Identifies Proper Compressor Utilization

### Energy consumption dominates life cycle costs

Energy conservation and green initiatives are at the forefront of company's strategic plans as regulatory pressures and corporate focus in this area increase. Whether these initiatives are to reduce "non-productive" energy consumption or to shrink a company's carbon footprint, all areas are under evaluation.

The electricity required to operate a compressor dominate its life cycle costs and make it a prime target for energy savings. A 150hp compressor operating 6000 hours per year with an electrical rate of \$0.07/kWh would cost in excess of \$500,000 to operate over a 10 year span. Under these operating conditions, the electricity costs account for over 80% of the life cycle costs.

### 10 YEAR LIFE CYCLE COST @ \$0.07/kWh



Gardner Denver, an **ENERGY STAR PARTNER**, is committed to developing products and introducing technologies that help conserve energy and protect the environment.



Gardner Denver 150 hp  
Rotary Screw Compressor

## Manage your equipment for best efficiency

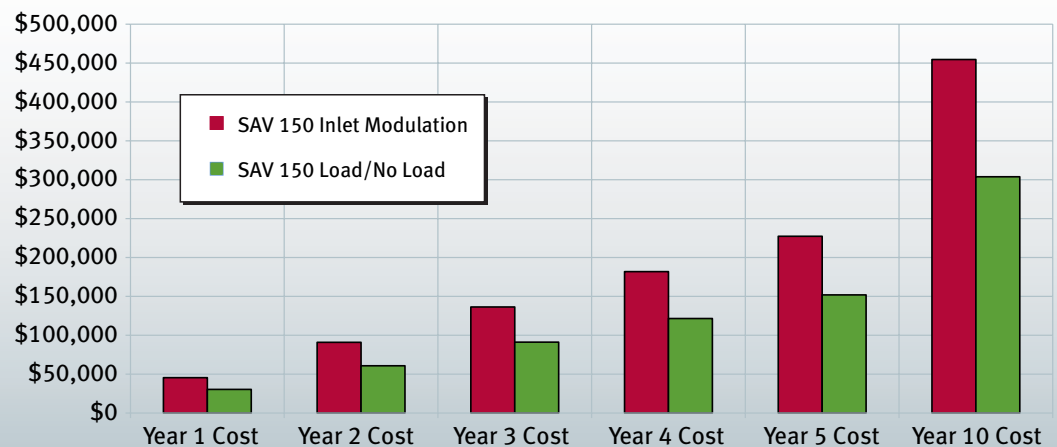
ESP 20/20 provides performance and operational information in multiple forms, allowing educated decisions to be made on how the compressor asset is being utilized month-to-month, day-to-day and shift-to-shift. How a compressor is utilized can have a significant impact on energy consumption as shown in this example.

The annual electrical costs of a 150hp inlet modulated air compressor operating in a medium demand profile, 6000 hours a year, with an electrical rate of \$0.07 kW/hr is over \$45,000. Evaluating system performance with ESP 20/20 can identify the potential for significant energy savings. Utilizing the same compressor in a load/no-load configuration and adding a receiver could result in \$15,000 annual electrical savings or \$150,000 over a 10 year span.

### COMPRESSOR UTILIZATION COMPARISON

Manufacturer	Gardner Denver	Gardner Denver
Control Type	Inlet Modulation	Load/No-Load
Receiver Size	NA	5625
Compressor	150HP	150HP
Total Demand Profile kW	108.2	72.3
Total Annual Operating Hours	6000	6000
\$/kWh Rate	\$0.07	\$0.07
Year 1 Cost	\$45,459	\$30,381
Year 2 Cost	\$90,917	\$60,763
Year 3 Cost	\$136,376	\$91,144
Year 4 Cost	\$181,835	\$121,526
Year 5 Cost	\$227,294	\$151,907
Year 10 Cost	\$454,587	\$303,814

### COST COMPARISON



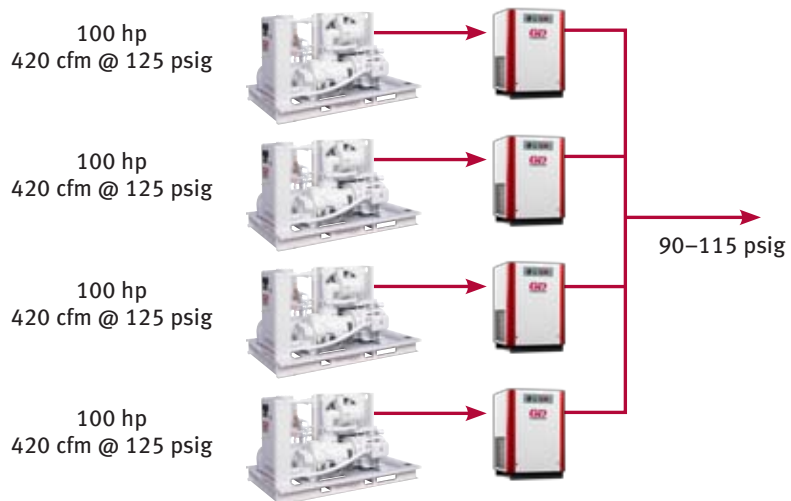
# ESP 20/20 Identifies System Efficiency Benefits

## System Optimization

The design objective of any supporting system is to provide the needed resource at the lowest possible cost. ESP 20/20 provides the ability to monitor performance and utilization on individual compressors, allowing educated system level decisions to be made. Decisions based on key performance data can yield energy cost savings in the operation of the compressed air system which is an increase in net profit!

## HOW IS YOUR SYSTEM CURRENTLY OPERATING?

A system that utilizes four 100 hp, 420 cfm compressors as shown must be baselined to understand how the system is currently operating.



## ANNUAL ENERGY CONSUMPTION (BASELINED)

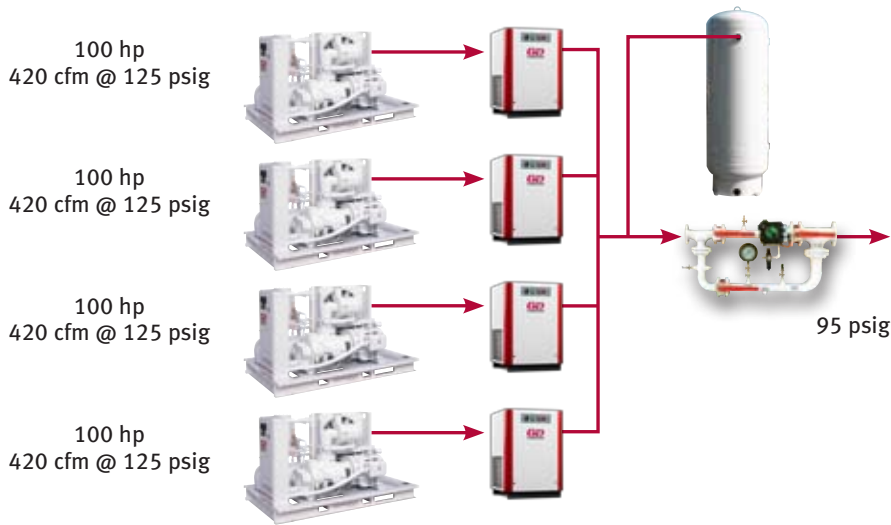
Flow	% Time	Unit 1	Unit 2	Unit 3	Unit 4	Total kW	Hours	kW Net	\$/kWh	Elect \$
1500	1%	84.2	84.2	84.2	84.2	336.8	8760	29503.7	\$0.07	\$2,065.26
1400	1%	82.8	82.3	82.8	82.8	331.2	8760	29013.1	\$0.07	\$2,030.92
1300	5%	81.3	81.3	81.3	81.3	325.2	8760	142437.6	\$0.07	\$9,970.63
1200	10%	79.8	79.8	79.8	79.8	319.2	8760	279619.2	\$0.07	\$19,573.34
1100	10%	78.3	78.3	78.3	78.3	313.2	8760	274363.2	\$0.07	\$19,205.42
1000	15%	76.8	76.8	76.8	76.8	307.2	8760	403660.8	\$0.07	\$28,256.26
900	15%	75.4	75.4	75.4	75.4	301.6	8760	396302.4	\$0.07	\$27,741.17
800	10%	76.8	76.8	76.8		230.4	8760	201830.4	\$0.07	\$14,128.13
700	10%	74.8	74.8	74.8		224.4	8760	196574.4	\$0.07	\$13,760.21
600	10%	72.9	72.9	72.9		218.7	8760	191581.2	\$0.07	\$13,410.68
500	5%	70.9	70.9	70.9		212.7	8760	93162.6	\$0.07	\$6,521.38
400	5%	68.9	68.9	68.9		206.7	8760	90534.6	\$0.07	\$6,337.42
300	2%	67.0	67.0	67.0		201.0	8760	35215.2	\$0.07	\$2,465.06
200	1%	65.0	65.0	65.0		195.0	8760	17082.0	\$0.07	\$1,195.74

Annual Operating Cost **\$166,661.63**



### OPTIMIZE YOUR SYSTEM FOR BEST EFFICIENCY

Evaluating load and run times can identify needs for system control and yield cost savings.



### ANNUAL ENERGY CONSUMPTION (SYSTEM OPTIMIZED)

Flow	% Time	Unit 1	Unit 2	Unit 3	Unit 4	Total kW	Hours	kW Net	\$/kWh	Elect \$
1500	0%	85.9	85.9	85.9	59.3	317.0	8760	0.0	\$0.07	\$0.00
1400	0%	85.9	85.9	85.9	44.5	331.2	8760	0.0	\$0.07	\$0.00
1300	7%	85.9	85.9	85.9	29.6	287.3	8760	176172.4	\$0.07	\$12,332.07
1200	10%	85.9	85.9	77.0		248.8	8760	217948.8	\$0.07	\$15,256.42
1100	10%	85.9	85.9	62.2		234.0	8760	204984.0	\$0.07	\$14,348.88
1000	15%	85.9	85.9	47.4		219.2	8760	288028.8	\$0.07	\$20,162.02
900	15%	85.9	85.9	32.6		204.4	8760	268581.6	\$0.07	\$18,800.71
800	10%	85.9	79.8			165.7	8760	145153.2	\$0.07	\$10,160.72
700	10%	85.9	65.2			151.1	8760	132363.6	\$0.07	\$9,265.45
600	10%	85.9	50.4			136.3	8760	119398.8	\$0.07	\$8,357.92
500	5%	85.9	35.6			121.5	8760	53217.0	\$0.07	\$3,725.19
400	5%	82.9				82.9	8760	36310.2	\$0.07	\$2,541.71
300	2%	68.1				68.1	8760	11931.1	\$0.07	\$835.18
200	1%	53.3				53.3	8760	4669.1	\$0.07	\$326.84

Annual Operating Cost **\$116,113.10**

The annual operating cost savings potential is significant and over the life of the system can represent over \$500,000.00.

# ESP 20/20 Advantages

## ESP 20/20

### SINGLE COMPRESSOR REMOTE MONITORING

ESP 20/20 is a wireless remote monitoring solution that upgrades the air compressor to an intelligent asset providing system performance and advisory notification. Interfacing directly to Gardner Denver or third party compressors via discrete inputs and outputs, any compressor asset can be transformed to provide critical operational information through a single web-based application.

## Wireless:

### INSTALLATION HAS NEVER BEEN EASIER

One of the unique features of ESP 20/20 remote monitoring is wireless access to the compressor. This feature is only offered by Gardner Denver's ESP 20/20 and provides significant advantages over IP/Network or RS232/Serial based systems.

- Eliminates time and expense of running CAT5 or other types of cabling to the compressor.
- Eliminates IP configuration and Network setup.
- No need to access IT experts for installation.
- Remote monitoring channel is isolated from your IP network for excellent security.
- Flexibility in where a compressor can be located.
- Ease of relocating a compressor, if needed, without having to re-route wires.



Avoid IT wiring headaches with a wireless solution

## Enterprise/Web Based Solution:

### ANYTIME, ANYWHERE ACCESS

ESP 20/20 is an enterprise web-based solution, a Gardner Denver exclusive feature, which provides substantial advantages over peer to peer solutions offered in most competitive products.

- Allows multiple compressor assets, at single or multiple locations, to be viewed from single web-based interface.
- No application software needed to view and monitor compressor assets.
- Easy access from any computer anywhere with access to the internet.
- Enterprise password protection allows passwords to be assigned to specific personnel at appropriate levels.
- Alert preferences for personnel are assignable to meet individual needs.
- Automatic notifications of advisories, alarms, or scheduled maintenance via email, text, page, or voice to match today's mobile technology and work environment.

**GD XTRA**  
10 Year Protection

ESP 20/20 qualifies the compressor for **GD XTRA**, Gardner Denver's extended warranty program on airends, delivering the tools to ensure the compressor is operating at peak performance with the peace of mind that the compressor is protected.

<http://www.esp2020.com>

## Notification:

### ALWAYS IN TOUCH

Being responsive when there is an issue with the compressor is critical in keeping an operation running and delivering product or services. This is where ESP 20/20 utilizes the latest technology to be more responsive without the intervention of valuable personnel.

When an advisory or measurement is outside the operating parameters that are considered “normal,” they are sent to the compressed air expert automatically. Notifications can be setup to contact multiple support persons each having their own personal preferences on how to be notified for best response. Notifications can be sent via email or text to a mobile device, pager, and voice. This type of direct connection ensures the appropriate service person is contacted automatically in the method of choice.

Extending this capability further, ESP 20/20 continually contacts the correct service personnel if an advisory is not responded to in an appropriate amount of time. Notifications are executed without having to involve additional personnel at the plant allowing them to focus on getting product out the door.



Notification of remote personnel

Notification through multiple technologies



# ESP 20/20 in Detail

## Eyes & Ears for Your Compressor

In order to maintain the compressor asset and ensure operation uptime, ESP 20/20 monitors critical operating parameters.

### Temperature

ESP 20/20 will monitor the compressor airend discharge and package discharge temperatures. Monitoring of temperature in real time provides powerful insight into the operation of the compressor and is a key monitoring point in avoiding catastrophic airend failures and extending the useful life of a machine.



### Pressure

Discharge pressures are a clear indication if the compressor is operating at or near its intended design point. If the discharge pressure at package output is not at the intended design point, it can indicate demand in excess of capacity or a dirty inlet air filter. High pressure conditions at the airend and package outputs may also result in high temperature conditions. Coupling pressure with other readings, such as power, can provide further insight into the compressor operation.



## Power

Ensuring overall system performance and efficiency are maintained, ESP 20/20 monitors the compressor input power consumption. This information can be viewed at specific points or captured over user-defined periods of time. Historical comparisons can be used to ensure the compressor is operating at the designed efficiency over its entire operating life.

## Load & Run Time

Load and Run time are monitored directly from the main controller on a Gardner Denver compressor. By evaluating these times, it can be determined if the compressor is properly utilized or if adequate receiver capacity is in place to meet demand requirements. System configuration along with control and automation needs can be evaluated to ensure the compressed air system is optimized for its intended use and energy savings are realized.

## Advisories

Unprecedented access to the operational advisories and monitor points within the compressor are provided by ESP 20/20. Access to these advisories provides key information that allows remote troubleshooting and can reduce or eliminate multiple site visits. Access to maintenance advisories allows educated decisions to be made on service and maintenance intervals.

*typical alarms*

Timers		
Search Results - 4 matches found.		
Status	Instrument	Timer
	Change_Oil	8562:56
	Change_Oil_Filter	8562:56
	Change_Air_Oil_Separator	8562:56
	Change_Air_Filter	8562:56

## Graphing

Key operating parameters such as discharge temperature, discharge pressure, power, and load time can be graphed with ESP 20/20. This tool can be invaluable in trend analysis and evaluation of compressor performance over short or long periods of time.

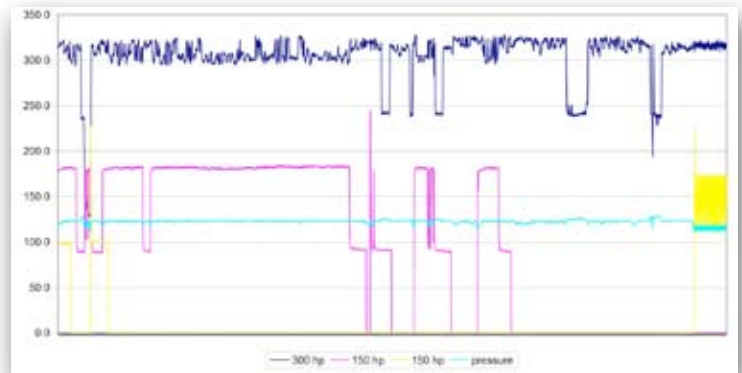
This data can also aid in troubleshooting a compressor if a problem is occurring at specific periods or specific points in time. Historical data can be captured at any previous time interval allowing review of compressor operation and isolation of a problem.



typical time period graph

## Export Capability

In addition to being able to graph information on the fly within ESP 20/20, data can also be exported into a Microsoft Excel® format. This feature provides further capability in analyzing the performance and operation of a compressor asset in a custom fashion. Data can be exported in user selectable periods of time providing the tools and flexibility to evaluate a system at any historical period of time.



typical exported graph

## Third Party Support

The features and information received is not limited to GD compressors. You can also interface ESP 20/20 to third party compressors. System performance and diagnostics can still occur if you own multiple brands of compressors.

## Additional Auditing & System Optimization Services Offered

### Auditing

In addition to remote monitoring, Gardner Denver's ESP 20/20 Audit team has assisted hundreds of compressed air users of all sizes and in many different industries. The focus of all Gardner Denver audits is return on investment and the lowest operating cost for the compressed air system.



Typical System Installation

### Smart Buying

Whether you are purchasing a new system or are upgrading an existing system, Gardner Denver auditing can begin before the compressed air system is purchased, ensuring your system is the most efficient possible to meet productivity demands.

### Energy Cost Reduction

Gardner Denver Auditing of existing systems typically identifies 25-50% in potential energy cost savings. By analyzing air demand, air storage, system piping, dryers, filtration, and system controls, all system costs are examined with cost reductions made where possible.

### Partnership

When performing system evaluation Gardner Denver works with your team in understanding how compressed air is utilized throughout your facility. Emphasis is placed on understanding current and future growth needs. All recommendations include costs and payback for the design and any system changes allowing you to make the best value decision for your operation.

### System Controllers

As part of the system evaluation and auditing, Gardner Denver offers system controllers to meet your complex compressed air system requirements. The ESP 1000 system controller can operate up to 10 compressors within a system, providing the flexibility to handle the most complex compressed air system.



ESP 1000 System Controller

## Smart Solutions

Base Expert and Dynamic Expert are Gardner Denver exclusive features.

Base Expert control sequence is designed to be used when the sum of the trim compressors capacities exceeds the size of the largest base compressor capacity. Base Expert adds and deletes base compressors as required, keeping the smaller and more efficient compressors in a trim position.

Dynamic Expert control sequence is designed to be used when the sum of the trim compressor(s) do not exceed or equal the size of the largest base compressor. This intelligent algorithm determines if and when a smaller compressor can perform in the lead position by replacing a larger partially loaded compressor in the sequence.

## System Stability

Most compressed air systems experience pressure fluctuations of 10% to 20%. As compressed air is an ingredient in the plant process, this inconsistency will have a negative impact on production. With Demand Expansion, the process sees only a constant pressure, regardless of demand or system events.

## System Optimization – Demand Expander

When used with the Gardner Denver XMx Demand Expander, the ESP 1000 and 400 series controllers will provide for maximized air compressor efficiency by creating real storage in the receiver tanks. The system is then maintained at the lowest tolerable pressure level reducing the flow through leaks and unregulated applications.



Gardner Denver XMx Expander

## Other Innovative Products



### VS Series 11–170 kW (15–228 hp)

Designed from the ground up as a variable speed solution, the VS Series produces the widest turndown range in the industry. Coupled with the highest efficiency and maximum reliability the VS Series provides the most flexible solution in the market with unprecedented features and controls.

- 40–1056 cfm
- Variable Speed, Direct Drive
- 64–77 dBA
- Wide turndown range
- Air Smart Controller



### Electra-Saver II 15–200 hp

Workhorse air compressors from 15 hp all the way to 200 hp. Electra-Saver II compressors are Direct Drive with oversized airends and bearings insuring energy savings and long life.

- 42–1000 cfm
- 15–200 hp
- Direct Drive
- Low-Noise
- Enclosed or Un-Enclosed



### EndurAir 5–20 hp

Large compressor quality in a small package. The EndurAir Series 5–20 hp rotary screw compressors are equipped with all of the components needed for a quality compressor: Advanced airend for efficiency, low noise, and microprocessor control providing all necessary notifications to ensure long-life.

- 15–84 cfm
- 69–74 dBA
- Base or Tank Mounted
- Advanced AirPlus Controller

# Gardner Denver®



Please recycle after use.

Member



[www.GardnerDenverProducts.com/esp2020.aspx](http://www.GardnerDenverProducts.com/esp2020.aspx)  
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