# EnviroAire ES Rotary Scroll Compressors

May 2019



#### EnviroAire Scroll Overview

#### **SCROLL AIRENDS & OPERATING PRINCIPALS**

- Components
- Compression Cycle
- Products

#### ENCLOSED SCROLL COMPRESSOR PACKAGE

- Performance
- Model Identification
- Package
- Controls

OPERATION FAQs MAINTENANCE INDUSTRIES & APPLICATIONS COMPETITIVE COMPARISON



# Scroll Airends & Operating Principals





### Scroll Airend Components – Exploded View



### Scroll Airend Components - Cross Section





## Scroll Airend Components - Tip Seal



### **Compression Cycle**



#### **Compression Cycle**



R

## **Compression Cycle**





#### EnviroAire Scroll Airends



SC3-5

#### SC5

5 Horsepower

• 140psi

#### 5 Horsepower

• 116psi



**SC7** 

#### 7.5 Horsepower

- 116psi
- 140psi

**SC10** 

- 10 Horsepower
  - 116psi
  - 140psi



# Enclosed Scroll Compressor Packages



#### EnviroAire ES Series

#### **Package Features and Options**

- Available with 5, 7.5, or 10 HP airends / motors
- Sound attenuating enclosure 64 72 dB(A)
- Air cooled with integrated package cooling
- 116 PSI flow range of 13.7 124 cfm
- 140 PSI flow range of 12.5 101 cfm
- Simplex as base or tank mounted
  - Horizontal 30, 80 or 120 Gal
  - Basic relay or deluxe HMI control
- Multiplex as base mount only (duplex / triplex / quadraplex)
  - Remote tanks available (Vertical 80, 120 or 240 Gal)
  - Deluxe HMI control only
- Global Voltages
  - 60Hz 3ph: 208, 230, 380, 460, 575 \*1ph: 208, 230
  - 50Hz 3ph: 200, 400





## Packaging Flexibility

**Base Mount** 

Simplex



**Tank Mount** Simplex



Duplex





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**Stacked Multiplex** 

Triplex / Quadraplex



## EnviroAire ES

5HP Configurations:	7.5HP Configurations:	10HP Configurations:
Simplex: ES5 = 5HP total	Simplex: ES7 = 7.5HP total	Simplex: ES10 = 10HP total
Duplex: ES10 D = 10HP total	Duplex: ES15 D = 15HP total	Duplex: ES20 D = 20HP total
Triplex: ES15 T = 15HP total	Triplex: ES22 T = 22.5HP total	Triplex: ES30 T = 30HP total
Quadraplex: ES20 Q = 20HP total	Quadraplex: ES30 Q = 30HP total	Quadraplex: ES40 Q = 40HP total
Capacity Range:	Capacity Range:	Capacity Range:
13.7 – 54.8 acfm @ 116psi	21.5 – 86.0 acfm @ 116psi	31.0 – 124.0 acfm @ 116psi
12.5 – 50.0 acfm @ 140psi	15.8 – 63.2 acfm @ 140psi	25.3 – 101.0 acfm @ 140psi
Working Pressure:	Working Pressure:	Working Pressure:
116 or 140 psig	116 or 140 psig	116 or 140 psig
Cooling:	Cooling:	Cooling:
Air	Air	Air
Voltage:	Voltage:	Voltage:
60Hz 1 or 3ph:	60Hz 1 or 3ph:	60Hz 3ph: 200,230,460,575
200,230,460,575	200,230,460,575	50Hz 3ph: 200,400
50Hz 3ph: 200,400	50Hz 3ph: 200,400	



## EnviroAire Models (Enclosed Products)

#### **5HP Model Numbers**

ES5	Scroll, 5HP total (5HP x 1) simplex
ES10 D	Scroll, 10HP total (5HP x 2) duplex
ES15 T	Scroll, 15HP total (5HP x 3) triplex
ES20 Q	Scroll, 20HP total (5HP x 4) quadraplex



#### 7.5HP Model Numbers

ES7	Scroll, 7.5HP total (7.5HP x 1) simplex
ES15 D	Scroll, 15HP total (7.5HP x 2) duplex
ES22 T	Scroll, 22.5HP total (7.5HP x 3) triplex
ES30 Q	Scroll, 30HP total (7.5HP x 4) quadraplex

#### **10HP Model Numbers**

Scroll, 10HP total (10HP x 1) simplex
Scroll, 20HP total (10HP x 2) duplex
Scroll, 30HP total (10HP x 3) triplex
Scroll, 40HP total (10HP x 4) quadraplex



# EnviroAire System Identification (Enclosed Products)











## Package - Simplex





## Package - Simplex



## Cooling - Simplex

Airflow across the primary aftercooler comes from the integral air end cooling fan



through the package and across the secondary aftercooler









## Package - Duplex







### Cooling – Duplex

Airflow across the primary aftercooler comes from the integral airend cooling fan



through the package and across the secondary aftercooler













Airflow across the primary aftercooler comes from the integral airend cooling fan


#### Package - Quadraplex





### Cooling – Quadraplex

Three 780 cfm cooling fans force air through the package and across the secondary aftercooler

Airflow across the primary aftercooler comes from the integral airend cooling fan



## Enclosed Scroll Controls



### Simplex Relay Control Panel

- UL508A labeled
- Magnetic contactor with overload protection
- Door mounted reset button
- 115 volt control circuit transformer with fusing
- Green power "ON" light
- Run time meter
- Pressure Gauge
- Test-Off-Auto selector switch





#### Deluxe HMI Controller



- Resistive touch screen
- Easy to use and intuitive screen navigation and menu structure
- Password protection scheme
- Integral Webserver (for remote monitoring)
- Multiple language support

#### FEATURES

- PLC controlled
- Low voltage 24VDC operation with SmartWire DT communication
- Expandable I/O to meet the needs of large compressor packages
- 4-20mA analog inputs to support analog pressure transducers
- Analog PT1000 RTD inputs to support temperature transducers
- Secured Data (SD) Card slot
- 3.5" (320x240) full color display with LED back light



#### Deluxe HMI Controller





- Home Screen
- System Monitoring
- Settings
- Alarm Log
- Login
- Languages (direct path)
- Maintenance (direct path)

Accessible through the banner located at the bottom of most screens.





### Deluxe HMI Controller – Home Screen

The *Home* screen is the primary source of basic system status and operation. It includes system pressure, control state, date and time, total system run hours, navigational icons, and an illustration of the system.

Compressor #1

Compressor #2

Compressor #3

Compressor #4



SYSTEMS

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### Deluxe HMI Controller – System Monitors

System Monitoring is a visual display of analog sensor values being monitored by the PLC. These screens can be accessed by pressing the gauge icon repeatedly.









## Deluxe HMI Controller - Settings

The *Settings* menu contains the parameters used to configure the operation of the scroll system.

#### Control

- 1) Target Pressure
- 2) Enable Remote Halt
- 3) Enable Auto Restart
- 4) Auto Restart Delay Time

AutoRun Schedule	
AutoRun	DISABLED
Start Time	00 : 00 🗎
Stop Time	00 : 00 🗎
Mode	MONDAY - FRIDAY

OK

#### Configuration

- 1) Language
- 2) Pressure Units
- 3) Temperature Units
- 4) Horsepower
- 5) Network Configuration
- 6) Date/Time Set
- 7) Pump Type

#### **Factory Settings**

Contains parameters only meant to be viewed or changed at the "Factory" level of security.



#### AutoRun Schedule

- 1) AutoRun Enable
- 2) Start Time
- 3) Stop Time
- 4) AutoRun Mode



### Deluxe HMI Controller – Alarms & Shutdowns

The *Alarm Log* screen allows the user to see active and historical alarms and shutdowns that have occurred in the system. The *Alarm Log* stores both the type and time of Event occurrence and uses a color scheme to differentiate alarms from shutdowns.

Alarn	n Log		
	Timestamp		Fault 🔺
0	15.05.2019 14:51:33	EMERGENCY S	ТОР
ACK	selected ACK al	visible	History

Aları	n Log				V	
	Timestam	р		Fau	lt	
0	15.05.2019 14:08:52		EMERGENO	CY STOP		
					llistern	
ACK	selected	ACK all	visible		History	



## Deluxe HMI Controller – Login

The Login screen allows the user to log in to the controller at the appropriate level of security.

- CUSTOMER Default login level
- MAINTENANCE Basic adjustments and routine maintenance
- DISTRIBUTOR Access for qualified distributors to make appropriate configuration changes to the unit
- FACTORY Highest level of security, access to all settings available on the controller.





#### Deluxe HMI Controller – Language

The Language screen allows the user to change the displayed language.



noose Language	
Greek	Turkish
Hungarian	Serbian
Lithuanian	Latvian
Norwegian	Romanian
Polish	Slovak
Slovene	Croatian
$\bigcirc \uparrow \bigcirc$	ОК



### Deluxe HMI Controller – Maintenance



The *Maintenance* screen allows the user to log in to the controller for basic adjustments and to do routine service resets.

Maintenance	
Timers Compressors	Motor Jog Diagnostics





## **Operation FAQ's**



#### Standard Operation FAQs

#### **Q: How do the scroll compressors operate?**

A: The scroll packages only operate as Start/Stop. When the system pressure drops to the first preset cut in point, the airend will turn on and operate until the pressure builds up to the preset cut out point then shut off.

## Q: When a multiplex system is first turned on with no pressure in storage, will the entire package turn on? Example: On quad, will all 4 units start at the same time?

A: Upon start up of any multiplex package that has no system pressure, the units will turn on one-by-one with timed delay. The factory default is set at 3 seconds. This eliminates the massive in-rush current that would happen from starting all 4 units at one time.



#### Standard Operation FAQs

Q: On a multiplex unit, what if one airend can keep up with the demand without bringing the next unit online, will it just keep running?

A: That airend will operate for 15 minutes before an auto rotation cycle.

#### **Q:** Can I change the factory pre-set pressure?

A: The factory default limits are set by the package design of 116psi and 140psi max. But, with a factory code you can lower the preset pressure limit.

Q: Can I change the differential pressures that determine when each airend comes on?

A: We have preset factory differentials, different for each configuration. Only with a factory code can the differential pressure be increased or decreased. The differential selected is uniform between each airend.

Example: A triplex 116 PSI unit has a preset selection of 14 PSID between each pump. You can't choose to have the first one at 10, second at 15 and third at 20 PSID. It will always be a consistent differential from the first to the last airend.



#### Standard Operation FAQs

Q: Will the airends shut off as the system pressure is being brought back up? Example: A 116 PSI duplex turns the first airend on at 98 PSI, and the second airend turns on at 80 PSI. Will the second airend turn off when the system gets back up to 98 PSI?

A: No, once the airend(s) is turned on it will operate until it reaches full package target pressure (116 or 140 PSI) again then shut off.

Example: A triplex unit at 116 PSI turns on pump #1 at 102, #2 at 88, and #3 at 74 PSI, they will all three operate until the system reaches the target pressure (116 PSI) again, and then the entire system will shut off. The lead unit will be automatically rotated for the next cycle.

HMI w/Pressure Transducer	Simplex	Duplex	Triplex	Quadraplex	Simplex	Duplex	Triplex	Quadraplex
Target Pressure	116 psig	116 psig	116 psig	116 psig				
Pump 1 – Cut In	94 psig	98 psig	102 psig	106 psig	22 psid	18 psid	14 psid	10 psid
Pump 2 – Cut In		80 psig	88 psig	96 psig		18 psid	14 psid	10 psid
Pump 3 – Cut In			74 psig	86 psig			14 psid	10 psid
Pump 4 – Cut In				76 psig				10 psid



## Maintenance



### Maintenance (116 PSI)

	Inspection	Maintenance and Inspection Time Interval						
Component	Instructions	500 hrs. Or 2 mo	2,500 hrs. Or 1 yr	10,000 hrs. Or 4 yrs	20,000 hrs. Or 8 yrs			
Bolts, Nuts, screws	Inspect and tighten	•0						
Suction Filter	Clean or Replace	Clean ●O	Replace ●O					
Scroll Fins	Clean dirt off		•0	•0				
Bearings	Inspect & Re-Grease			•0				
Tip Seals	Replace			•0				
Scroll Pump	Replace				•0			

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• = 5 HP

0 = 7.5 & 10 HP



### Maintenance (140 PSI)

	Incorporations	Maintenance and Inspection Time Interval						
Component	Inspection	500 hrs. Or 2 mo	2,500 hrs. Or 1 yr	5,000 hrs. Or 2 yrs	10,000 hrs. Or 4 yrs	15,000 hrs. Or 6 yrs		
Bolts, Nuts, screws	Inspect and tighten	•0						
Suction Filter	Clean or Replace	Clean ●O	Replace ●O					
Scroll Fins	Clean dirt off			•0	ο			
Bearings	Inspect & Re-Grease			•0	ο			
Tip Seals	Replace			•0	0			
Scroll Pump	Replace				•	0		

#### • = 5 HP

0 = 7.5 & 10 HP



### Warranty

COMPONENT	STANDARD WARRANTY COVERAGE	DETAILS
Package	12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first	All components within the package, excluding normal wear items
Airend	12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first	Normal wearing items, along with the servicing of these items is not covered under the warranty unless deemed as material or workmanship defects. Any disassembly or partial disassembly of the airend, or failure to return the "unopened" airend per Company instructions, will be cause for denial of warranty
Electric Motors	12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first	Includes both drive motor and cooling fan motor. For nonstandard motors, the original manufacturer's warranty will take precedence.
Major Package Components	12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first	Includes package controller, variable frequency drive if applicable, and air cooler.
Labor	Package / Electric Motors: 12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first Airend / Major Package Components: 12 months from startup or 15 months from date of shipment to first purchaser, whichever occurs first	Service will be provided by Company representative or authorized service personnel, for repair or replacement of any product or part which in the Company's sole judgment is proved not to be as warranted. Labor shall be limited to the amount specified in the Company's labor rate schedule. All costs of transportation of product, parts, and repaired or replacement parts claimed not to be as warranted to and from such service facilities shall be borne by the Purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by Company, transportation prepaid by Purchaser, to establish a claim under this warranty. Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period.



## Industries & Applications



#### Oil-Less Scroll Compressor Markets Industrial

- Breathing Air (Paint & Cleaning Booths)
- Pharmaceutical
- Food / Beverage Processing
- High Tech Machinery (Semi-Conductors, Laser Cutting, Printing, Air Bearings)
- Instrument Air (Controlled Atmosphere)



### Oil-Less Scroll Compressor Markets Laboratory (Procedure)

- Biotech
- Photo Laboratories
- Lens Grinding
- Dental (Manufacturing)
- Quality Control/Testing

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#### Oil-Less Scroll Compressor Markets Institutional

- Medical Equipment (Sterilizers, Orbital Arms, Radiation Tomo-Therapy)
- Laboratory (Medical Research, College & High Schools)
- Dental Facilities (Procedure)
- HVAC Climate Control (Healthcare Facilities, College Buildings)

SYSTE

## **Competitive Comparison**



#### U.S. - 5HP Position





#### U.S. - 7.5HP Position





#### U.S. - 10HP Position





#### U.S. - 15HP Position





#### U.S. - 20HP Position





#### U.S. - 22HP Position





#### U.S. - 30HP Position





#### U.S. - 40HP Position





# **THANK YOU!**

