



US Drives Inc.  
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 Visit us at [www.usdrivesinc.com](http://www.usdrivesinc.com)

**US Drives, Inc. offers a Wide Range of Products to meet your specific Application Requirements:**

**PHOENIX DS AC DRIVE  
 3 HP TO 3500 HP**

The Phoenix DS AC Drive is truly the most rugged, most reliable ac drive on the market today. It was designed to easily handle the tough applications that cause other ac drives to trip or fail. Sensorless AC Vector Drive technology means higher starting torque, improved speed regulation, and better overall drive performance. Phoenix DS is suitable for most conventional ac drive applications from pumps and fans to more sophisticated material processing applications. You should be using our Phoenix DS AC Drive if you are currently experiencing any problems due to high input ac line voltage, ac power line transients, high ambient temperature, or difficult loads including shock loads, impact loads, and loads with very high starting torque.



**PHOENIX ES AC DRIVE  
 3 HP TO 3500 HP**

The Phoenix ES AC Drive is a high performance AC Vector Drive with Closed Loop (Encoder Feedback) capability. Phoenix ES offers precise control of both motor speed and motor torque, improved speed regulation, and enhanced low speed performance with operation to and through zero speed. Phoenix ES includes the ability to follow an external frequency reference signal and position synchronize two or more ac motors with zero drift over time. Like our other products, Phoenix ES stands up to high ac line voltages, nasty ac power line transients, high ambient temperatures, and difficult loads.



**SINGLE PHASE PHOENIX AC DRIVES 3HP TO 500HP**

Many locations only have Single Phase power available. Examples of applications at these sites include: agriculture (irrigation, pumping, loaders, and other machinery), oil and gas (pumping, water injection and extraction). Three Phase AC Drives have long been used on Single Phase power systems but with significant degradation of performance and with a host of reliability problems.



**AC LINE REGEN MODULE 5 HP TO 1750 HP**

Our AC Line Regen Module is a unique product that turns any PWM AC Drive into a Line Regenerative AC Drive. Regenerative energy from the AC Motor is efficiently returned to the AC Power Line eliminating the need for inefficient braking resistors. Our AC Line Regen Module is easy to install and simple to use with no user adjustments to worry about.



**THREE YEAR WARRANTY**

**MADE IN USA**



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### **REGENERATIVE DC COMMON BUS SUPPLY 5 HP TO 1300 HP**

The Regenerative DC Common Bus Supply supplies both motoring and regenerative current to the DC bus of one or more AC drives without the need of rectifier front end in each AC drive. When the overall power requirements of the attached common DC bus drives require motoring power, energy flows from the utility to the common DC bus. When the overall power requirements of the attached common DC bus drives require regenerative power, energy flows from the common DC bus to the utility.

### **PHOENIX DS CLEAN POWER AC DRIVE 40 HP TO 1000 HP**

The Phoenix DS Clean Power AC Drive uses 18 Pulse Rectification to minimize harmonic distortion on the ac power line. It easily meets the stringent requirements of IEEE 519 1992 for Total Harmonic Current and Total Harmonic Voltage Distortion without the use of additional harmonic filters, ac line reactors, or drive isolation transformers. Our Phoenix Clean Power AC Drive includes all the same features that make our Phoenix DS AC Drive a truly outstanding product.



### **REGENERATIVE AC DRIVES 5 HP TO 1750 HP**

Regenerative AC Drives are available for those applications that require precise control of both motoring torque and braking torque. Typical applications include test stands, high inertia loads that must be stopped quickly, uncoilers and payoffs, hoists and cranes, downhill conveyors, and holdback rolls in process line applications. For applications that require a Sensorless AC Vector Drive, choose the Phoenix DS Regenerative AC Drive. For applications that require a Closed Loop AC Vector Drive, choose the Phoenix ES Regenerative AC Drive.



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## AC DRIVE PRODUCT LINE SUMMARY

| DESIGN FEATURES  | PHOENIX DS  |                                |                                | PHOENIX ES                                       |                                |                                | PHOENIX DS CLEAN POWER                 |                                |                                |
|--|---|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|
| Drive Type   | PWM - Sine Coded  |                                |                                | PWM - Sine Coded                                 |                                |                                | PWM - Sine Coded                       |                                |                                |
| Control Method   | Sensorless Vector   |                                |                                | Closed Loop Vector                               |                                |                                | Sensorless Vector                      |                                |                                |
| Input Rectification  | 6 Pulse (Standard)<br>12 Pulse (Optional)   |                                |                                | 6 Pulse (Standard)<br>12 Pulse (Optional)        |                                |                                | 18 Pulse                               |                                |                                |
| Input Voltage<br>+/- 10% Voltage<br>+/- 2 Hz   | 200 to 250<br>3 Ph<br>50/60 Hz  | 380 to 500<br>3 Ph<br>50/60 Hz | 525 to 600<br>3 Ph<br>50/60 Hz | 200 to 250<br>3 Ph<br>50/60 Hz                   | 380 to 500<br>3 Ph<br>50/60 Hz | 525 to 600<br>3 Ph<br>50/60 Hz | 200 to 250<br>3 Ph<br>50/60 Hz         | 380 to 500<br>3 Ph<br>50/60 Hz | 525 to 600<br>3 Ph<br>50/60 Hz |
| Horsepower Range   | 3 to 250  | 5 to 3000                      | 5 to 3500                      | 3 to 250   | 5 to 3000                      | 5 to 3500                      | 20 to 250                              | 40 to 1000                     | 40 to 1000                     |
| Output Frequency   | 0 to 600 Hz   |                                |                                | 0 to 600 Hz                                      |                                |                                | 0 to 600 Hz                            |                                |                                |
| Speed Regulation   | 0.5% of Max Speed   |                                |                                | 0.01% of Max Speed with Encoder                  |                                |                                | 0.5% of Max Speed                      |                                |                                |
| Speed Range  | 50 to 1   |                                |                                | To Zero Speed with Encoder                       |                                |                                | 50 to 1                                |                                |                                |
| Overload Capability:<br>- Normal Overload Capacity (VT)<br>- High Overload Capacity (CT) | 120% for 1 Minute<br>150% for 1 Minute  |                                |                                | 120% for 1 Minute<br>150% for 1 Minute           |                                |                                | 120% for 1 Minute<br>150% for 1 Minute |                                |                                |
| Dynamic Braking  | Optional - To 150% of Rated   |                                |                                | Optional - To 150% of Rated                      |                                |                                | Optional - To 150% of Rated            |                                |                                |
| Regenerative Braking   | Optional<br>100% Continuous<br>150% for 1 Minute  |                                |                                | Optional<br>100% Continuous<br>150% for 1 Minute |                                |                                | Not Available                          |                                |                                |
| Features Drive   | <p><b>Open Loop AC Vector Control (DS)</b></p> <ul style="list-style-type: none"> <li>- 100 to 1 Speed Range, 0.1% Speed Regulation</li> <li>- Open Loop Control (Standard)</li> <li>- Sensorless AC Vector Control for Precise Control of Motor Speed and Torque</li> <li>- Highest Starting Torque - Smart Power Start Maximizes Motor Torque Per Ampere</li> <li>- Continuous Automatic Tuning – Provides Optimal Performance Under All Conditions</li> <li>- Power Loss Ride Through</li> <li>- High Performance PID Control Loop (Full Setpoint Control or Trim Control)</li> <li>- Sleep Mode PID</li> <li>- Pump Underload and Overload Protection and Load Recovery</li> <li>- Pump Backspin Control</li> <li>- Bi-Directional Flycatcher (Start Into a Rotating Motor) With No Inertia Limits</li> </ul> <p><b>Closed Loop AC Vector CONTROL (ES)</b></p> <ul style="list-style-type: none"> <li>- 1000 to 1 Speed Range, 0.01% Speed Regulation</li> <li>- Closed Loop Control (with Encoder Feedback Card)</li> <li>- Speed Control, Torque Control, Speed Control with Torque Limit, Torque Control with Speed Limit</li> <li>- Full Torque at Zero Speed – Hold Position / Hold Zero Speed</li> <li>- Rigid and non-rigid position control including orientation</li> <li>- Permanent Magnet Motor Control</li> <li>- No Need to Perform Auto-tune Routine or Disconnect the Motor from the Load or During Drive Start-Up</li> <li>- Operator Keypad with English Language Display – 2 Line, 32 Character. Easily Display any parameter including Motor Speed, Motor Current, Motor Voltage, Kw, and kWh. User Programmable Parameter Scaling and Formatting – Display “Real World” Values – GPM, CFM, PSI</li> <li>- Operator Keypad Includes Speed Increase/Decrease Keys, Start/Stop, Forward/Reverse, and Fault Reset Keys also LED's for “Current Limit”, “Fwd/Rev”, “Run”, and “Fault.”</li> </ul> |                                |                                |  |                                |                                |  |                                |                                |
| Control Options  | <ul style="list-style-type: none"> <li>- Communication Cards - RS-232/422/485, Modbus RTU, Ethernet, Many Others Available</li> <li>- I/O Expansion Card - Analog and Digital</li> <li>- Encoder Feedback and Second Encoder Follower Card (Closed Loop Vector Drives Only)</li> <li>- Process Input / Output Signal Isolation Cards (4 to 20 ma or - 10VDC to + 10VDC)</li> <li>- 115 VAC Operator (Digital Input) Interface Card</li> <li>- Operator Devices: Manual Speed Pot, Hand/Off/Auto, Local/Remote, Auto/Manual Switches</li> <li>- Many Others</li> </ul>   |                                |                                |  |                                |                                |  |                                |                                |
| Surge Suppression  | Line Transients to 6000 Volts - IEEE C62.41-1991 Category B   |                                |                                |  |                                |                                |  |                                |                                |
| Noise Immunity   | Showering Arc to 2000 Volts Peak - EN50082-1.2  |                                |                                |  |                                |                                |  |                                |                                |
| Ambient Temperature  | -10°C to 50°C (14°F to 122°F)   |                                |                                | -10°C to 50°C (14°F to 122°F)                    |                                |                                | -10°C to 50°C (14°F to 122°F)          |                                |                                |
| Input RFI Filter   | Standard  |                                |                                | Standard   |                                |                                | Standard                               |                                |                                |



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## AC REGEN AND DC COMMON BUS SUPPLY SUMMARY

### SPECIFICATIONS AND FEATURES

#### Electrical Specifications:

|                                    |   |
|------------------------------------|---|
| Rated Input Voltage:               | 200-250Vac, 380-500Vac, 500-600Vac<br>-10% of minimum, +10% of maximum.   |
| Frequency Tolerance:               | 47-63 Hz  |
| Number of Phases:                  | 3   |
| Efficiency:                        | 99% or greater  |
| Max. Short Circuit Current Rating: | 200,000A rms symmetrical, 600 volts (when used with AC input line fuses specified in tables 1 to 3).              |
| Noise Immunity:                    | IEEE C62.41-1991 Category B (Formerly known as IEEE 587) - 6000V tests<br>EN50082-1, 2 Generic Immunity Standards |

#### Environmental Specifications:

|                      |  |
|----------------------|--|
| Ambient Temperature: | -10°C to 55°C (14°F to 131°F) Nema type 1 enclosed.  |
| Storage Temperature: | -40°C to 70°C (-40°F to 158°F) Nema type 1 enclosed. |
| Altitude:            | Sea level to 3000 Feet [1000m] without derating.     |
| Humidity:            | 95% relative humidity non-condensing.                |
| Vibration:           | 9.8m/sec <sup>2</sup> (1.0G) peak.                   |

#### Physical attributes:

|               |   |
|---------------|---|
| Mounting:     | Though hole or panel mount.                         |
| Nema Rating:  | Type 1 (IP20) as standard, Type 12 (IP54) optional. |
| Construction: | Steel construction (reduces E.M.I.)                 |

#### Control I/O:

- 2 Digital Inputs: Regen Enable & Regen Reset
- 2 Digital Outputs: Dry contacts rated 115Vac @ 5A; 30Vdc @ 3.5A.
- 24Vdc source: Use to power operator pushbuttons and US Drives option boards: 24Vdc @ 100 mA max.

#### Protective Features:

- Peak output current monitoring to protect against line-to-line shorts and line-to-ground shorts.
- Ground fault monitoring.
- Heatsink over-temperature monitoring.
- AC line & DC bus over-voltage protection.
- AC line & DC bus under-voltage protection.
- Control power supply power ride-thru.
- Internal power supply monitoring.
- AC phase loss detection.

#### Standard Regen Features

- Latest generation IGBT.
- Nema type 1 (IP20) as standard for all models.
- 55°C ambient with standard Nema type 1 (IP20) enclosure.
- High voltage ratings: 250Vac+10% , 500Vac+10% models, and 600Vac+10% models
- Input line suppression: Metal oxide varistors for line-to-line and line-to-ground voltage surge protection.
- No programming or hardware jumper for all voltages.