

## SECTION 3 - DELTAMAX SPECIFICATIONS

| DeltaMax Driver | DMAX-1.5/RB      | DMAX-1.5/RA      | DMAX-4.25/RB     | DMAX-4.25/RA     |
|-----------------|------------------|------------------|------------------|------------------|
| Weight          | 3.3 lb<br>1.5 kg | 3.3 lb<br>1.5 kg | 3.3 lb<br>1.5 kg | 3.3 lb<br>1.5 kg |

| DeltaMax Driver | DMAX-8.5/RB      | DMAX-8.5/RA      | DMAX-17.5/RA     | DMAX-35/RA      | DMAX-50/RA      | DMAX-70/RA     | DMAX-115/RA    |
|-----------------|------------------|------------------|------------------|-----------------|-----------------|----------------|----------------|
| Weight          | 3.3 lb<br>1.5 kg | 3.3 lb<br>1.5 kg | 5.5 lb<br>2.5 kg | 10 lb<br>4.5 kg | 10 lb<br>4.5 kg | 24 lb<br>11 kg | 35 lb<br>16 kg |

### 3.1 MOTOR OUTPUT

| DeltaMax Driver                                       | DMAX-1.5/RB             | DMAX-1.5/RA  | DMAX-4.25/RB  | DMAX-4.25/RA  |
|---|-------------------------|--------------|---------------|---------------|
| Motor Output  | PWM, 3 Phase, sine wave |              |               |               |
| Continuous Output Current                             | 1.0<br>A rms            | 1.0<br>A rms | 2.8<br>A rms  | 2.8<br>A rms  |
| Max. Output Current<br>See <a href="#">Figure 3.1</a> | 1.5<br>A rms            | 1.5<br>A rms | 4.25<br>A rms | 4.25<br>A rms |
| Motor Ripple Frequency                                | 20 kHz                  | 20 kHz       | 20 kHz        | 20 kHz        |

| DeltaMax Driver  | DMAX-8.5/RB             | DMAX-8.5/RA  | DMAX-17.5/RA  | DMAX-35/RA    | DMAX-50/RA    | DMAX-70/RA    | DMAX-115/RA    |
|--|-------------------------|--------------|---------------|---------------|---------------|---------------|----------------|
| Motor Output   | PWM, 3 Phase, sine wave |              |               |               |               |               |                |
| Continuous Output Current  | 2.1<br>A rms            | 3.4<br>A rms | 5.7<br>A rms  | 14.1<br>A rms | 18.4<br>A rms | 28.3<br>A rms | 56.6<br>A rms  |
| Max. Output Current<br>3 seconds<br>See <a href="#">Figure 3.3</a> | 8.5<br>A rms            | 8.5<br>A rms | 17.5<br>A rms | 35.0<br>A rms | 50.0<br>A rms | 70.0<br>A rms | 115.0<br>A rms |
| Motor Ripple Frequency   | 20 kHz                  | 20 kHz       | 20 kHz        | 20 kHz        | 20 kHz        | 10 kHz        | 10 kHz         |

### 3.2 POWER SUPPLY

| DeltaMax Driver                  | DMAX-1.5/RB  | DMAX-1.5/RA   | DMAX-4.25/RB   | DMAX-4.25/RA  |
|----------------------------------|--|---|--|---|
| Main Bus Power Supply Voltage    | 1 Phase, Nominal: 110 VAC, Max Range: 85-126 VAC, 50/60 Hz | 1 Phase, Nominal: 220 VAC, Max Range: 170-264 VAC, 50/60 Hz | 1 Phase, Nominal: 110 VAC, Max Range: 85-126 VAC, 50/60 Hz | 1 Phase, Nominal: 220 VAC, Max Range: 170-264 VAC, 50/60 Hz |
| Main Supply Capacity             | 350 VA   | 350 VA  | 350 VA   | 350 VA  |
| Control Voltage                  | Powered by main circuit supply                             |   |  |   |
| Control Capacity                 | Powered by main circuit supply                             |   |  |   |
| Main Circuit Heat Loss           | 17 W   | 17 W  | 17 W   | 17 W  |
| Control Circuit Heat Loss        | 23 W   | 23 W  | 23 W   | 23 W  |
| Regeneration Absorption Capacity | 13 W + 17 J  | 13 W + 17 J   | 13 W + 17 J  | 13 W + 17 J   |

| DeltaMax Driver                  | DMAX-8.5/RB  | DMAX-8.5/RA   | DMAX-17.5/RA  | DMAX-35/RA                          | DMAX-50/RA   | DMAX-70/RA   | DMAX-115/RA   |
|----------------------------------|--|---|---|-------------------------------------|--------------|--------------|---------------|
| Main Bus Power Supply Voltage    | 1 Phase, Nominal: 110 VAC, Max Range: 85-126 VAC, 50/60 Hz | 1 Phase, Nominal: 220 VAC, Max Range: 170-264 VAC, 50/60 Hz | 3 Phase, Nominal: 220 VAC, Max Range: 170-264 VAC, 50/60 Hz |                                     |              |              |               |
| Main Supply Capacity             | 570 VA   | 1.2 KVA   | 2.5 KVA   | 5.3 KVA                             | 6.7 KVA      | 13 KVA       | 25 KVA        |
| Control Voltage                  | Powered by main circuit supply                             |   |   | Single phase, 170-264 VAC, 50/60 Hz |              |              |               |
| Control Capacity                 | Powered by main circuit supply                             |   |   | 70 VA                               |              | 80 VA        | 110 VA        |
| Main Circuit Heat Loss           | 20 W   | 27 W  | 47 W  | 110 W                               | 130 W        | 250 W        | 400 W         |
| Control Circuit Heat Loss        | 23 W   | 23 W  | 23 W  | 26 W                                | 26 W         | 30 W         | 60 W          |
| Regeneration Absorption Capacity | 17 W + 17 J  | 24 W + 17 J   | 37 W + 22 J   | 160 W + 54 J                        | 180 W + 54 J | 300 W + 94 J | 480 W + 188 J |

### 3.3 CONTROL PERFORMANCE

|                           |  |
|---------------------------|--|
| Feedback                  | Resolver   |
| Feedback Resolution       | 4096 bits/rev  |
| Feedback Accuracy         | 18 arc minutes spread for motor with 95 mm mounting face or smaller<br>±20 arc minutes for B series motors<br>8 arc minute spread for all other motors |
| Current Loop Update Rate  | 100 µsec   |
| Velocity Loop Update Rate | 400 µsec   |
| Position Loop Update Rate | 800 µsec   |
| Speed Regulation          | Load (0%-100%): ±0.02%<br>Power (85-126 VAC or 170-264 VAC): ±0.02%<br>Temperature (0-55°C/32-131°F): ±0.2%  |
| Torque Regulation         | Power (85-126 VAC or 170-264 VAC): ±2%<br>Temperature (0-55°C/32-131°F): ±2%   |

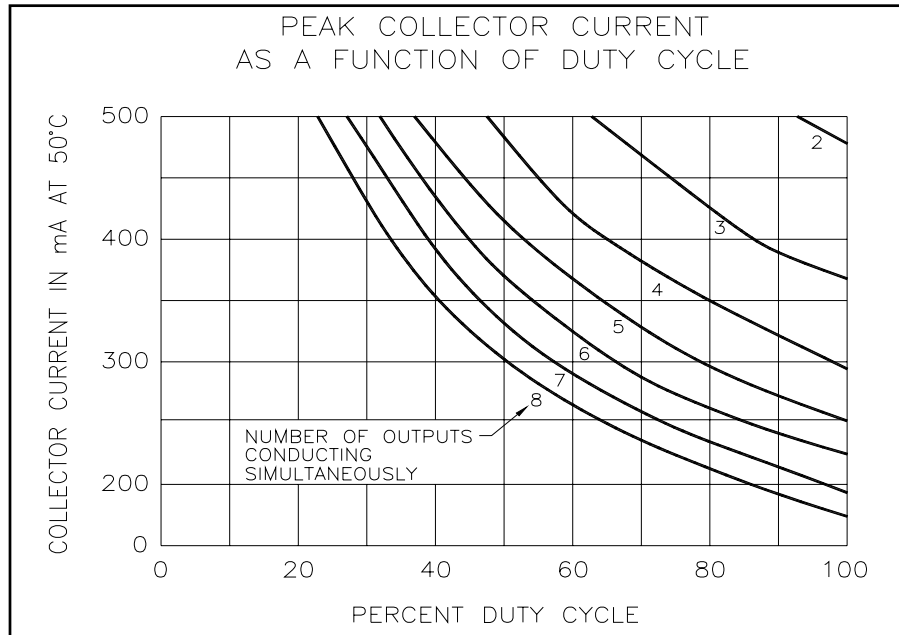
|                           |   |
|---------------------------|---|
| Feedback                  | Encoder   |
| Feedback Resolution       | 4096 bits/rev   |
| Feedback Accuracy         | Less than 2 arc minutes   |
| Current Loop Update Rate  | 100 µsec  |
| Velocity Loop Update Rate | 400 µsec  |
| Position Loop Update Rate | 800 µsec  |
| Speed Regulation          | Load (0%-100%): ±0.02%<br>Power (85-126 VAC or 170-264 VAC): ±0.02%<br>Temperature (0-55°C/32-131°F): ±0.2% |
| Torque Regulation         | Power (85-126 VAC or 170-264 VAC): ±2%<br>Temperature (0-55°C/32-131°F): ±2%                                |

### 3.4 ENVIRONMENT

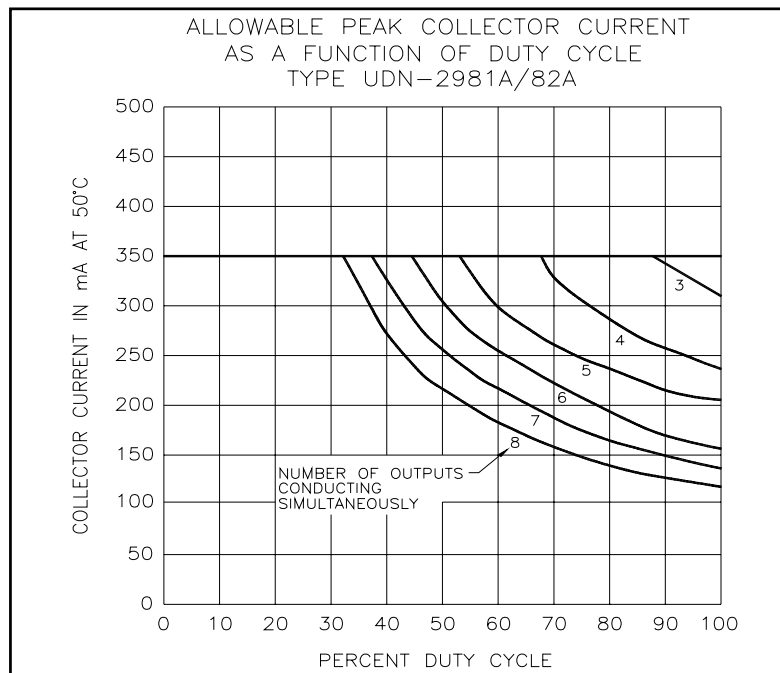
|                       |  |
|-----------------------|--|
| Storage Temperature   | -10 to 70°C/14-158°F   |
| Operating Temperature | 0 to 55°C/32-131°F   |
| Humidity              | 35 to 90% Relative Humidity, non-condensing  |
| Shock and Vibration   | 1 G or less  |
| Operating Conditions  | Free of dust, liquids, metallic particles and corrosive gases.<br>Use in a pollution degree 2 environment. |
| Drive Enclosure       | The drive is rated as "open type equipment" by Underwriters Laboratories, Inc.                             |

### 3.5 DIGITAL I/O SIGNALS

|                       |   | STANDARD | OPTIONAL |
|-----------------------|---|----------|----------|
| Control Input         | 24 VDC 5 mA, optically isolated                             | Sinking  | Sourcing |
| Control Output        | 24 VDC 500 mA, optically isolated (See Figures 3.1 and 3.2) | Sinking  | Sourcing |
| External Power Supply | 24 VDC $\pm$ 15%  |          |          |



**Figure 3.1 - Standard**



**Figure 3.2 - Optional**

### 3.6 ANALOG I/O SIGNALS

|                  |   |
|------------------|---|
| Analog Inputs    | Maximum Input Voltage: 0-5 VDC<br>A/D Resolution: 1/1024 10 bit<br>Input Impedance: 20k Ohm Single Ended<br>Scaleable slew rate with Macroprogramming   |
| Analog Output    | Maximum Output Voltage: 0-5 VDC<br>D/A Resolution: 1/1024 10 bit<br>Output Current: 5mA<br>Scaleable slew rate with Macroprogramming  |
| Analog Reference | Reference Voltage: 5 VDC / 5 ma   |
| Monitor Output   | Maximum Voltage Swing: $\pm 3$ VDC at 1 mA<br>Output Impedance: 330 $\Omega$<br>Accuracy: $\pm 8\%$<br>Monitor Scaling<br>Speed: 3V equals motor rated speed<br>Torque: 3V equals motor peak torque |

### 3.7 COMMUNICATION PORTS

|                      |   |
|----------------------|---|
| Port 1               | Classification: RS-232<br>Data Transfer: Packet protocol<br>Protocol: 19200 baud, 1 stop bit, 8 data bits, No parity  |
| Port 2               | Classification: RS-232<br>Data Transfer: Packet protocol (default), ASCII Programmable<br>Protocol: 19200 baud, 1 stop bit, 8 data bits, No parity (default)<br>This port can be redefined with Macroprogramming.                 |
| DeviceNet / CAN Bus  | Classification: CAN bus<br>DeviceNet: Data Transfer and Protocol are defined by the DeviceNet specifications. OR<br>CAN Bus: IIS unique software protocol for easy to use DeltaMax multidrop control. <b>Reference IB-11B023.</b> |
| Fiber Optic Receiver | Classification: Fiber Optics<br>Data Transfer: Master Angle (positional information)<br>Protocol: Proprietary   |

### 3.8 PROTECTION

|                                 |   |
|---------------------------------|---|
| Fault Checks                    | Under Voltage, Over Voltage, Motor Short, Output Short, Feedback Loss, Regeneration Resistor Over Temperature and Malfunction, Driver Over Temperature, Motor rms Torque (motor overheat) Driver Rated Current, Over Speed, Motor Stall, Dynamic or Mechanical Brake Failure, Following Error, Internal Watchdog Timer, Processor Diagnostics |
| Output Short Circuit Protection | The drives are suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes, 240 volts maximum when protected by a circuit breaker having an interrupting rating not less than 5000 rms symmetrical amperes, 240 volts maximum.   |

### 3.9 MOTOR SPECIFICATIONS

#### 3.9.1 GENERAL

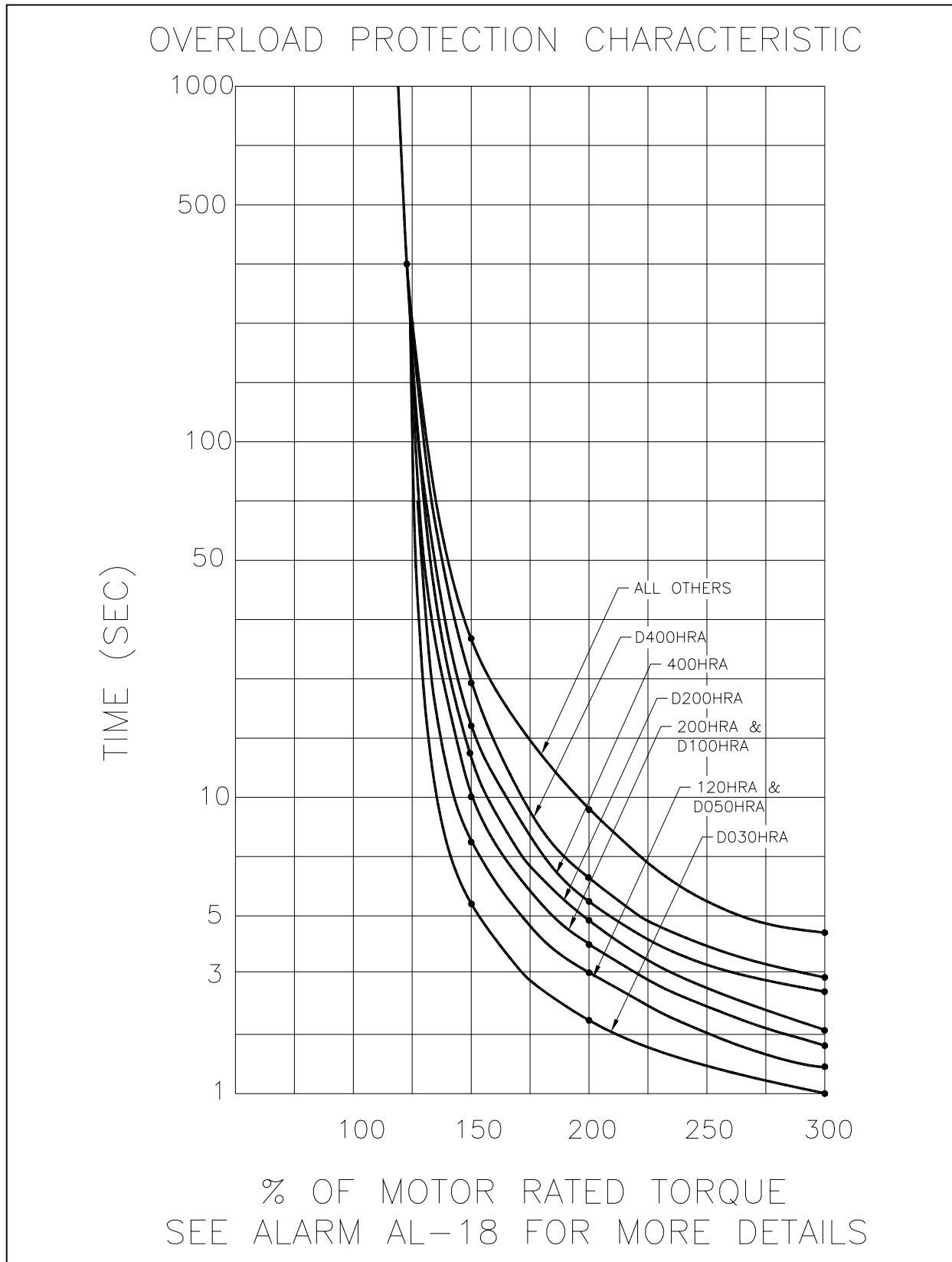
|                               |   |
|-------------------------------|---|
| Duty                          | Continuous at rated speed and rated torque                        |
| Type                          | Permanent magnet synchronous                                      |
| Insulation                    | Class F   |
| Sealing                       | See motor drawings in <a href="#">Appendix A.6, A.7 &amp; A.8</a> |
| Storage Temperature           | -10 to +70°C/14 to 158°F  |
| Ambient Operating Temperature | -10 to +40°C/14 to 104°F  |
| Shock and Vibration           | 2 G's   |
| Mounting                      | Motor can be mounted in any position                              |

#### 3.9.2 FEEDBACK DEVICE

|                |   |
|----------------|---|
| Type: Resolver | Resolver control transformer<br>See motor drawings in <a href="#">Appendix A.6, A.7 &amp; A.8</a> |
| Type Encoder   | ABZ plus UVW 5V line driver   |

#### 3.9.3 OTHER

|   |   |
|---|---|
| Weight<br>Shaft Loading<br>Brake Specifications<br>Dimensions | See motor drawings in <a href="#">Appendix A.6, A.7 &amp; A.8</a> |
| Torque Ratings<br>Speed Torque Curves                         | See specifications in <a href="#">Appendix A.4</a>                |



**Figure 3.3 - DeltaMax Overload Protection Characteristic**

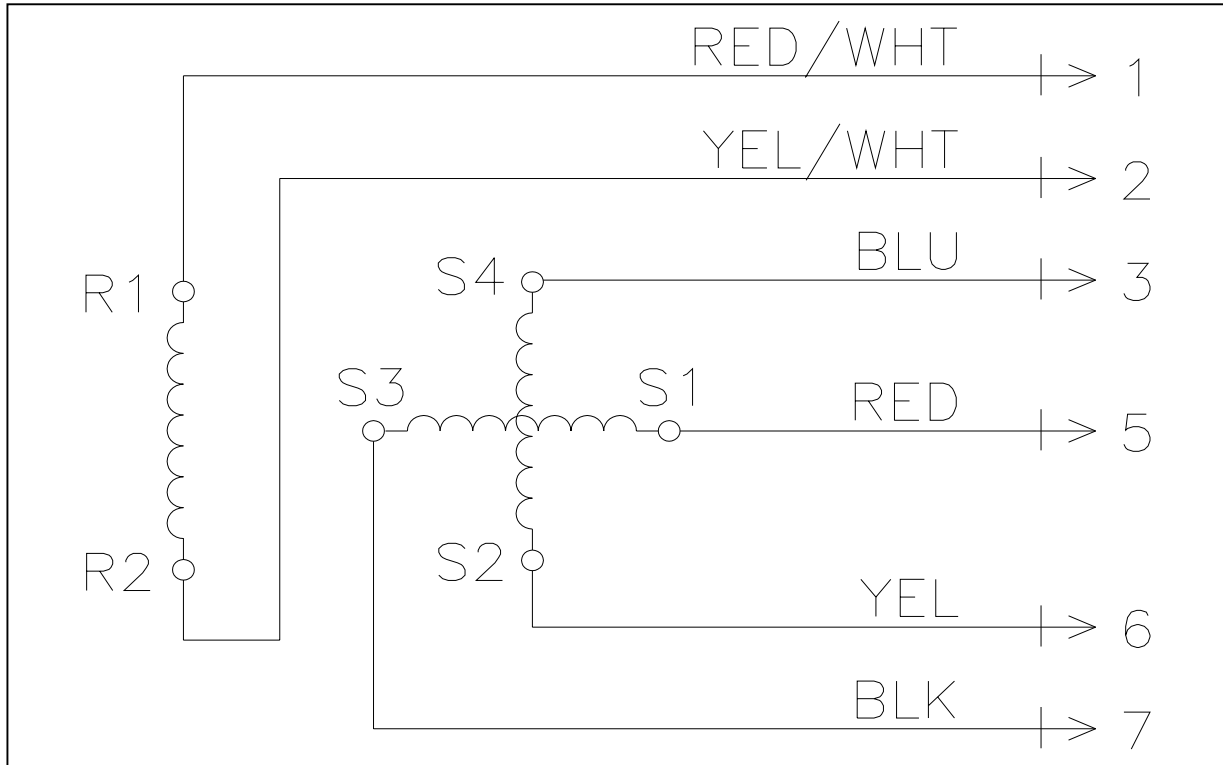


Figure 3.4 - Standard Resolver Wiring Connections for DBM-XXX/15R, DBM-500/30R and Larger

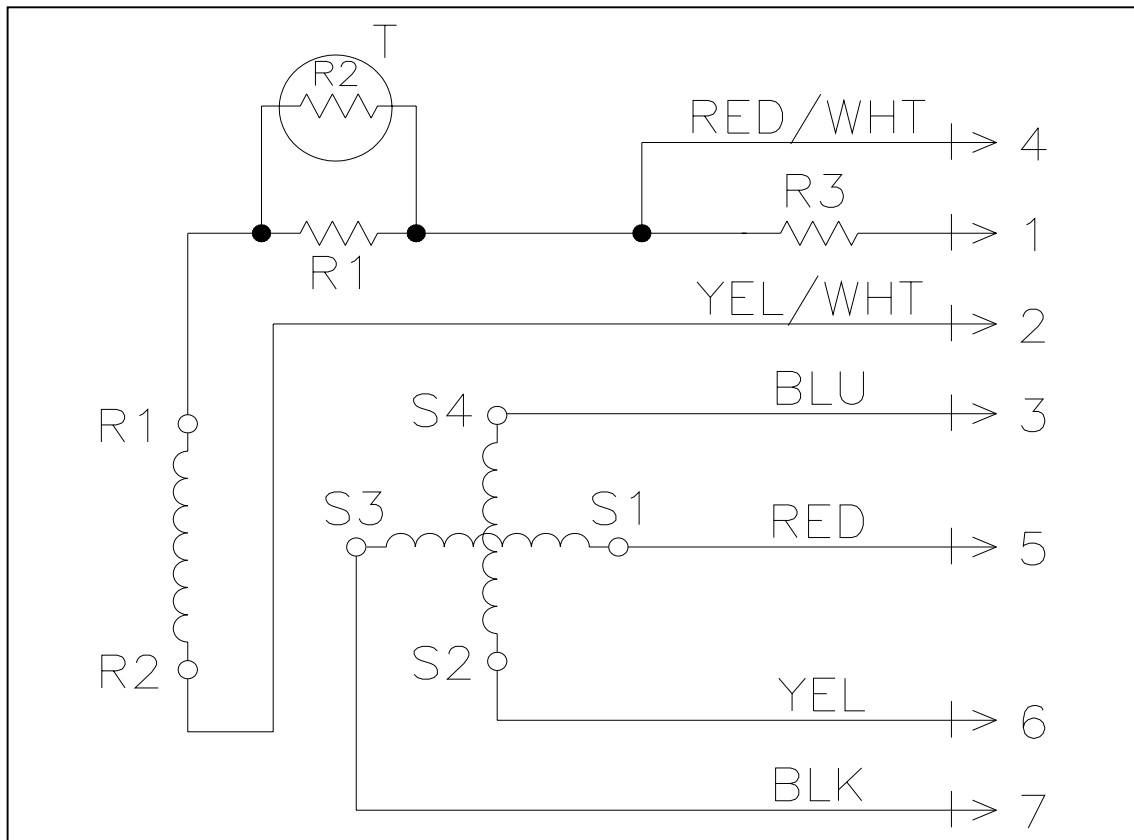
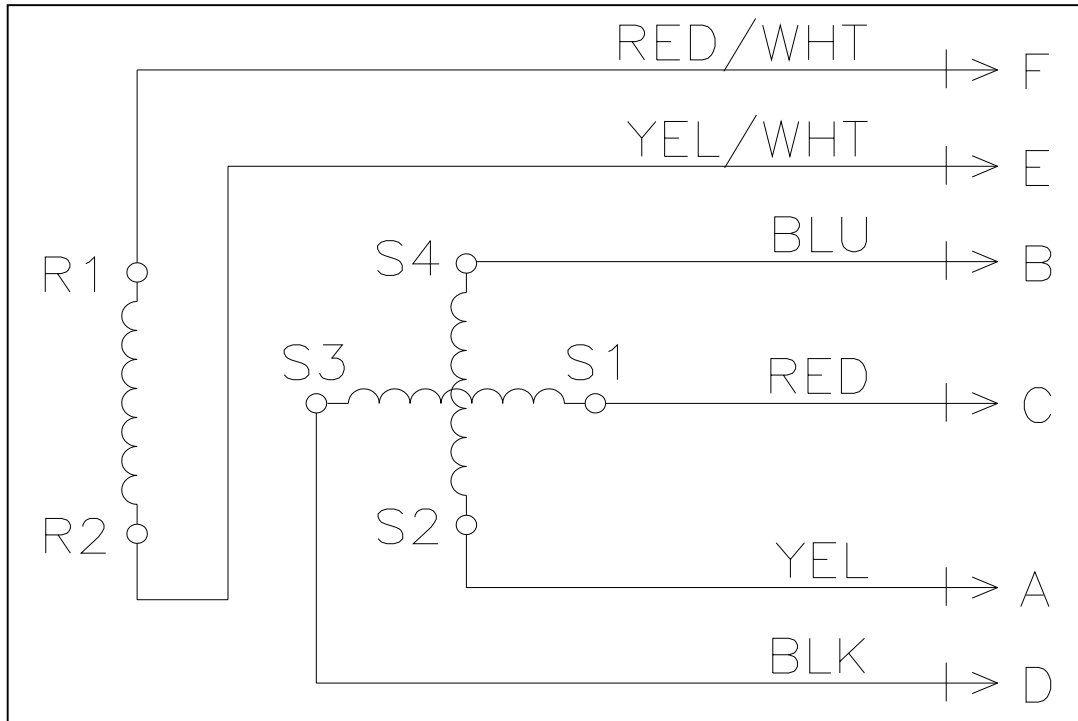
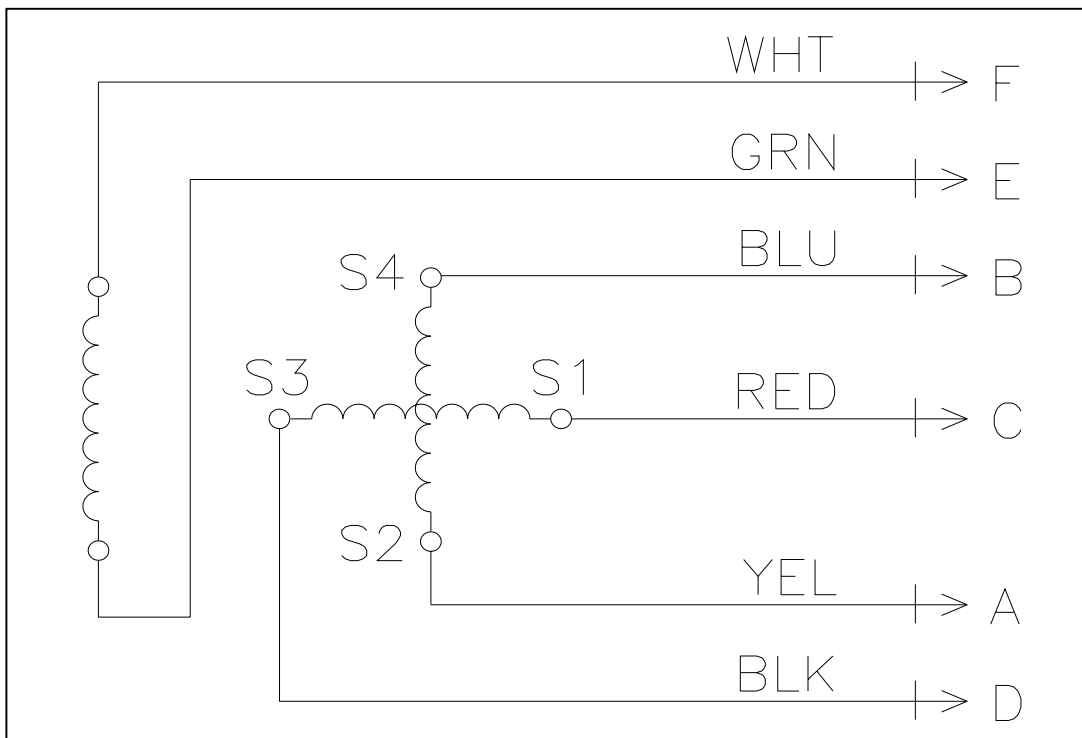


Figure 3.5 - Alternate Resolver Wiring Connections for DBM-XXX/15R, DBM-500/30R and Larger



**Figure 3.6 - Standard Resolver Wiring Connections for DBM-120/30R, DBM-200/30R, DBM-400/30R, DBM-BXXX/30R, DBM-D30/30R and DBM-D50/30R**



**Figure 3.7 - Alternate Resolver Wiring Connections for DBM-120/30R, DBM-200/30R and DBM-400/30R**

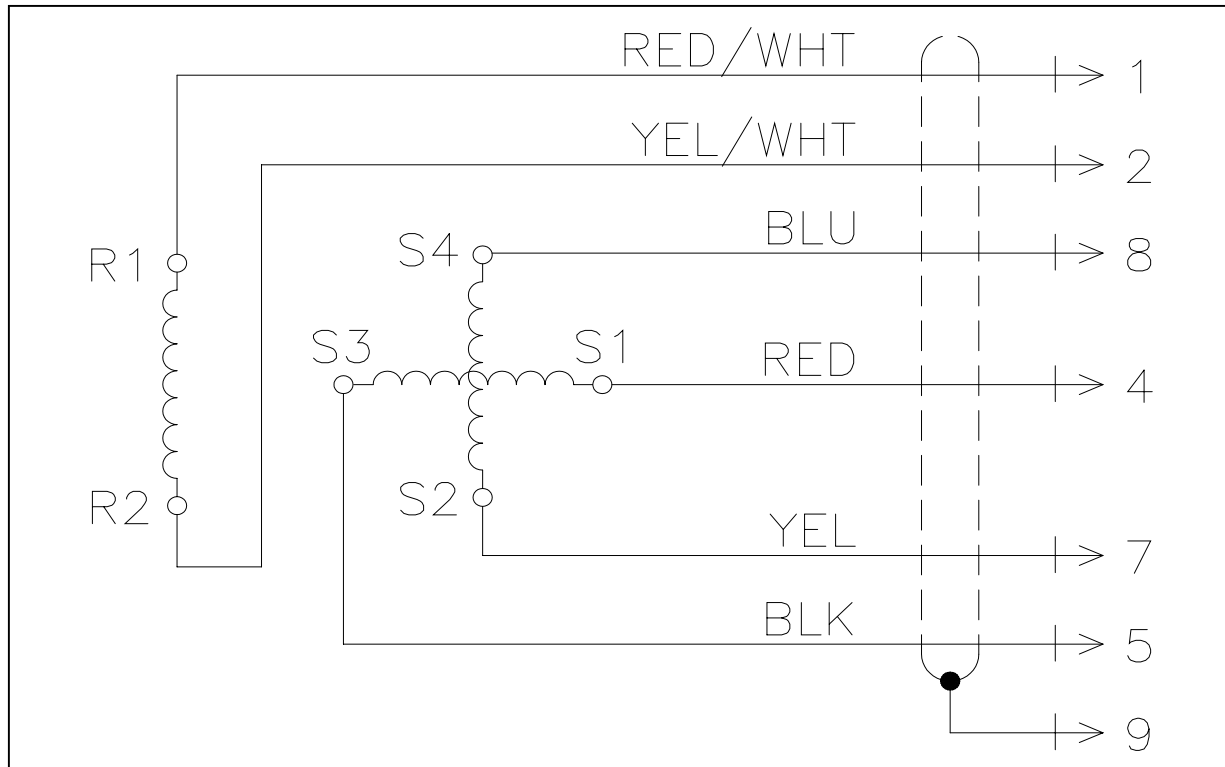


Figure 3.8 - Standard Resolver Wiring Connections for DBM-D100/30R Through DBM-D800/30R