

- 7) Slide encoder shaft into other side of coupling. DO NOT FORCE.
- 8) Ensure face on mounting flange matches and aligns with encoder face precisely.
- 9) Apply thread locker to face mounting screws or flange mounting bolts.
- 10) Align bolt holes of encoder and flange, thread in screws.
- 11) Tighten set screws on encoder side of coupling.

## WIRING INSTRUCTIONS

### CAUTION

**Be sure to remove power before wiring the AV20 Encoder.**

**Be sure to ground the cable shield: It can be connected to case ground at the encoder, or grounded at the receiving device, but should not be grounded on both ends.**

If necessary, case ground can also be provided through a separate wire. (Not available for 6-pin connectors: options "E", "F", "G", "H"). Be certain not to ground the case ground wire if the encoder is already grounded by mechanical mounting or coupling.

For bidirectional operation of the AV20 Encoder, proper phasing of the two output channels is important. For models with A and B output channels, Phase A channel leads Phase B channel for clockwise shaft rotation as viewed from the rear of the encoder for the standard wiring options. Follow instructions under corrective installation as needed to reverse the direction of output or purchase AV20 with reverse phasing (options "B", "D", "F", "H", "K", "N").

### CORRECTIVE ACTION FOR PHASE REVERSAL

- 1) Remove power.
- 2) Exchange wires on cable, either at encoder cable end, or at speed controller end (but not both):
  - a.) Single Ended 2 Phase Wiring (see wiring diagram)  
Exchange A and B at the user end of the wires.
  - b.) Differential 2 Phase Wiring (see wiring diagram)  
Exchange either A with  $\bar{A}$  in the phase A pair OR B with  $\bar{B}$  in the phase B pair but NOT both.
- 3) Apply power.
- 4) Verify encoder feedback is correct, using hand rotation of shaft, or jog mode of the speed controller.

Interconnecting cables specified in the wire selection chart below are based on typical applications. Refer to the system drawing for specific cable requirements where applicable.

Physical properties of cable such as abrasion, temperature, tensile strength, solvents, etc., are dictated by the specific application. General electrical requirements are: stranded copper, 22 thru 16 gauge, each wire pair individually shielded with braid or foil with drain wire, 0.05 uF maximum total mutual or direct capacitance, outer sheath insulator. See Wire Selection Chart below for some suggested cables.

\*Maximum cable length (and line driver selection) is limited by several factors: line driver protection, maximum RPM, PPR, output voltage and cable capacitance. The open collector driver (option 2) is much more heavily limited by output frequency on long cable runs, and is not recommended for new applications.

## SPECIFICATIONS

### ELECTRICAL

- A. Operating Power (Vin)
  1. Volts ..... See Line Driver Options
  2. Current ..... 50mA, no load
- B. Output Format ..... See Channel Options (A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$  available)
- C. Signal Type ..... Incremental, Square Wave, 50%  $\pm$ 10% Duty Cycle
- D. Direction Sensing ..... Phasing with respect to rotation as viewed from the back of the encoder (non-shaft side).  
Connector options "A", "C", "E", "G", "J", "M", "U", & "W":  $\emptyset$ A leads  
 $\emptyset$ B for CW rotation (Std. phasing).  
Connector options "B", "D", "F", "H", "K", "N", & "T":  $\emptyset$ A leads  
 $\emptyset$ B for CCW rotation (Reverse phasing).
- E. Transition Separation .... 15% minimum
- F. Frequency Range ..... 0 to 125kHz.
- G. PPR ..... 1 - 3600 standard (for other PPR needs up to 16,384 consult factory)
- H. Output ..... See Line Driver Options

### MECHANICAL

- A. Acceleration ..... 6,000 RPM/Sec.
- B. Speed ..... 6,000 RPM max. (for higher RPM needs, Consult Factory).
- C. Shaft Diameter ..... 0.25" to 0.394" [6.35mm to 10mm]
- D. Shaft Loading ..... up to 100 lbs [45 kg]. axial or radial
- E. Starting Torque @ 25C ... 2.5oz in max. [0.018n-m] (1.0oz [0.007n-m] in w/o seals)
- F. Weight ..... 0.575 lbs. [260g]

### ENVIRONMENTAL

- A. Enclosure Rating ..... NEMA 4, 13, IP65 (dust and water tight, not for immersion).
- B. Operating Temp. .... -40° to +100°C
- C. Humidity ..... 98% Non-condensing
- D. Shock ..... 50G, 11 ms Duration
- E. Vibration ..... 5-2000Hz @ 20G

### LINE DRIVER OPTIONS

		Output Options		
		1	2	4
Output Type		Differential Line Driver	Open Collector	Differential Line Driver, 5V fixed
Line Driver		7272	7273	7272
Voltage Input (Vin)		5-28VDC	5-28VDC	5-28VDC
Protection	Reverse Voltage	Yes	Yes	Yes
	Transient	Yes	Yes	Yes
	Short Circuit	Yes	Yes	Yes
Maximum Cable length*		5V 1000 ft 12V 500 ft 24V 200 ft	see note*	200 ft