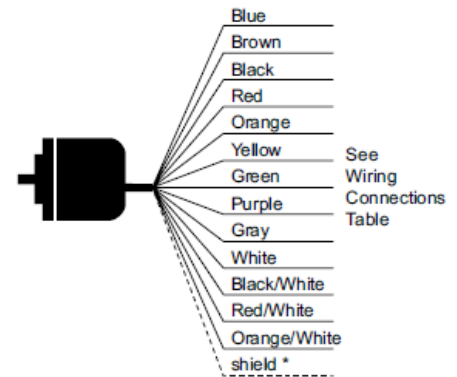


## Electrical Specifications

Electrical Specifications		TRD-NAxxxxNWD
Power Supply	Operating voltage *	10.8–26.4 VDC
	Allowable ripple	3% rms max
	Current consumption	70mA max
Output Waveform	Output code **	Gray binary
	Max response frequency	20kHz
	Operating speed	(Maximum response frequency / resolution) x 60 or 3000 rpm, whichever is less
	Accuracy	( 360 / (resolution x 2) ) degrees
	Rotation direction***	Normal: clockwise (cw) Reversed: counterclockwise (ccw)
Output	Rising/falling time ****	2.0 $\mu$ s max (@ 1k $\Omega$ load resistance)
	Output configuration	NPN open collector
	Output logic	Negative logic (active low)
	Sinking current	32mA max
	Residual voltage	0.4 V max @ $\leq$ 16mA 1.5 V max @ >16mA to 32mA
	Load power supply voltage	35VDC max
	Short-circuit protection	Not protected

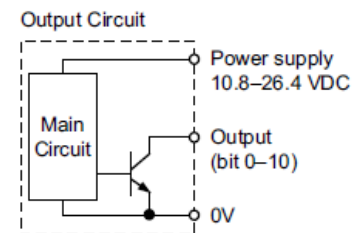
\* To be supplied by a class II source.  
 \*\* Resolution: 180      Excess gray codes: 38  
 Resolution: 360      Excess gray codes: 76  
 Resolution: 720      Excess gray codes: 152  
 \*\*\* As viewed looking from the shaft.  
 \*\*\*\* With a cable of 2m or less.

## Wiring Connections



\* Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire

## Output Circuit



ETA now uses 11 bit encoders

Wiring Connections								
Wire color	Pin #	Resolution						
		2048	1024 / 720	512 / 360	256 / 180	128	64	32
Blue	1	0V						
Brown	2	12/24V						
Black	3	bit 0 (2 <sup>0</sup> ) *	bit 0 (2 <sup>0</sup> ) *	no connection				
Red	4	bit 1 (2 <sup>1</sup> ) *	bit 1 (2 <sup>1</sup> ) *	bit 0 (2 <sup>0</sup> ) *	no connection			
Orange	5	bit 2 (2 <sup>2</sup> ) *	bit 2 (2 <sup>2</sup> ) *	bit 1 (2 <sup>1</sup> ) *	bit 0 (2 <sup>0</sup> ) *	no connection		
Yellow	6	bit 3 (2 <sup>3</sup> ) *	bit 3 (2 <sup>3</sup> ) *	bit 2 (2 <sup>2</sup> ) *	bit 1 (2 <sup>1</sup> ) *	bit 0 (2 <sup>0</sup> ) *	no connection	
Green	7	bit 4 (2 <sup>4</sup> ) *	bit 4 (2 <sup>4</sup> ) *	bit 3 (2 <sup>3</sup> ) *	bit 2 (2 <sup>2</sup> ) *	bit 1 (2 <sup>1</sup> ) *	bit 0 (2 <sup>0</sup> ) *	no connection
Purple	8	bit 5 (2 <sup>5</sup> ) *	bit 5 (2 <sup>5</sup> ) *	bit 4 (2 <sup>4</sup> ) *	bit 3 (2 <sup>3</sup> ) *	bit 2 (2 <sup>2</sup> ) *	bit 1 (2 <sup>1</sup> ) *	bit 0 (2 <sup>0</sup> ) *
Gray	9	bit 6 (2 <sup>6</sup> ) *	bit 6 (2 <sup>6</sup> ) *	bit 5 (2 <sup>5</sup> ) *	bit 4 (2 <sup>4</sup> ) *	bit 3 (2 <sup>3</sup> ) *	bit 2 (2 <sup>2</sup> ) *	bit 1 (2 <sup>1</sup> ) *
White	10	bit 7 (2 <sup>7</sup> ) *	bit 7 (2 <sup>7</sup> ) *	bit 6 (2 <sup>6</sup> ) *	bit 5 (2 <sup>5</sup> ) *	bit 4 (2 <sup>4</sup> ) *	bit 3 (2 <sup>3</sup> ) *	bit 2 (2 <sup>2</sup> ) *
Black / White	11	bit 8 (2 <sup>8</sup> ) *	bit 8 (2 <sup>8</sup> ) *	bit 7 (2 <sup>7</sup> ) *	bit 6 (2 <sup>6</sup> ) *	bit 5 (2 <sup>5</sup> ) *	bit 4 (2 <sup>4</sup> ) *	bit 3 (2 <sup>3</sup> ) *
Red / White	12	bit 9 (2 <sup>9</sup> ) *	bit 9 (2 <sup>9</sup> ) * (MSB)	bit 8 (2 <sup>8</sup> ) * (MSB)	bit 7 (2 <sup>7</sup> ) * (MSB)	bit 6 (2 <sup>6</sup> ) * (MSB)	bit 5 (2 <sup>5</sup> ) * (MSB)	bit 4 (2 <sup>4</sup> ) * (MSB)
Orange / White	13	bit 10 (2 <sup>10</sup> ) * (MSB)	no connection					
Shield	–	GND **						

\* Numbers in parentheses ( ) are the bits corresponding to binary code.  
 \*\* GND (cable shield) is not connected to encoder body; the enclosure is grounded through the 0VDC line.