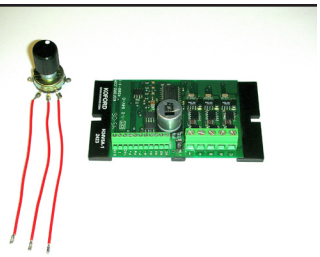
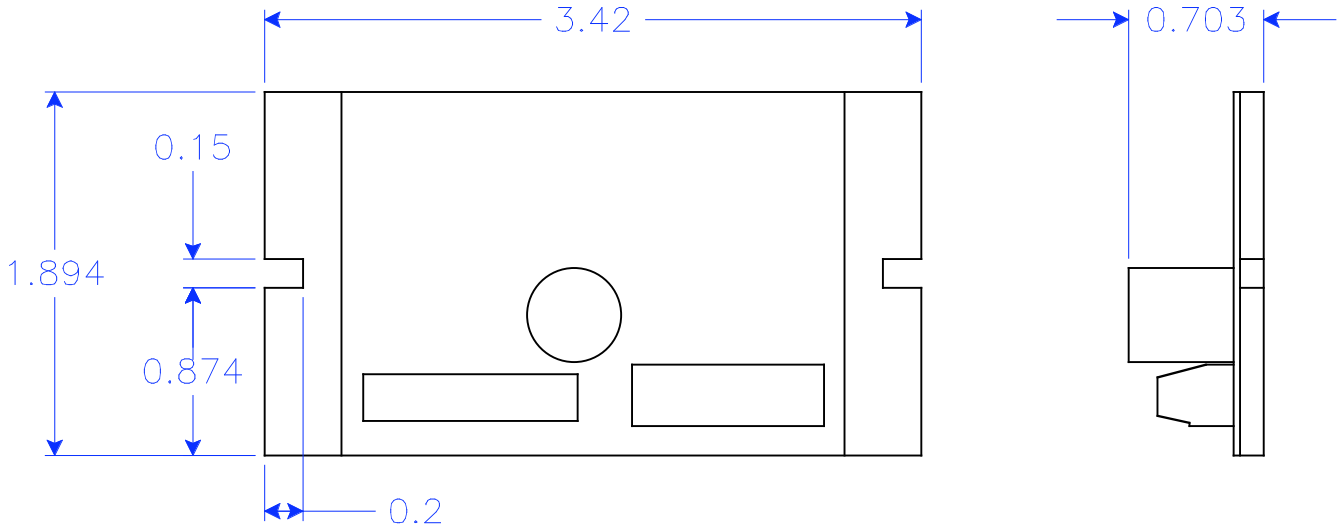
KOFORD ENGINEERING, LLC H24V5A hall sensor motor driver 5A 12-32V



Ultra high efficiency miniature hall sensor drive with 56k pwm frequency, designed for use with stand alone, digital or analog operation. The drive has no minimum inductance and will operate slotless or ironless brushless motors without the need for bulky, cumbersome inductors. Three types are available, a full featured -1 model which include tach and current output, speed control and direction control, a lower cost -2 which deletes the tach and current output, and -3 which has closed loop speed control at the board level and tach output. For stand alone operation the optional speed pot can be ordered. Once power supply, motor and speed pot are connected the motor can be operated without the need for any adjustments, set up or programing. If reversible operation is required a SPDT switch can be added between Dir and P-. For digital operation the unit will interface with a customers microcontroller. The microcontroller should be 5v or be a 3.3v with 5v interface capabilities. Speed input can be accomplished with a 0-5v analog input (less then 1mA) or a 100 hz to 100k Hz square wave with variable duty cycle. The input signal should be adjusted so as to close the loop with the TAC output which outputs a 4v square wave with a fixed on time. The frequency equals 6 pulses per revolution for a 2 pole motor, 12 for a 4 pole etc. The direction is controlled by 0v (reverse) or 5v (forward) to the DIR input. The current output is a DC voltage at 1v per amp of motor current (not power supply current). For analog operation the TAC output can be filtered and a DC voltage proportional to the rpm will result.



Terminal block positions (motor lead hook up for Koford motors)
DIR=leave unconnected for forward direction, hook to P- for reverse
I=current output, 1V = 1A of motor current
TAC=tach/encoder output 3 pulses per revolution per magnet pole pair (1,000 hz=10,000 rpm 2 pole motor)
P+=connect to one side of pot (6.2v)
PW=connect to pot wiper (center terminal)
P-=connect to other side of pot (ground)

H-=black motor wire (hall ground)
H+=red motor wire (hall power)
HA=yellow motor wire
HB=orange motor wire
HC=green motor wire
-=Connect to black (-) lead of power supply
+=Connect to red (+) lead of power supply
B=white motor wire
A=blue motor wire
C=brown motor wire

Ordering information:

mail@koford.com•phone 937-695-1275•fax 937-695-0237•www.koford.com

Part number: H24V5A-1 Drive with current and tach outputs
H24V5A-2 Drive without current and tach output
H24V5A-3 Closed loop drive with tach output

P1 Optional pot

5/10 Specifications subject to change

Notes

1. When using a microcontroller to operate the drive a 5 volts output should be used and the pwm frequency should be 8Khz or more, otherwise filtering of the output will be required.

2. The drives current output shows motor current, this is not the same as power supply current. A pwm drive acts much like a variable transformer to reduce the voltage and at the same time increase the current delivered to the motor. For example if the speed pot is set to 10% of maximum speed and the power supply shows 0.5 amp and 24 volts, the motor will see approximately 5 amps and 2.4 volts. This current sense output is approximate and is most accurate near full load current.

3. The current limiting of the drive limits the current delivered to the motor to slightly above 5 amps, this means that the current at the power supply will reach a maximum of alightly above 5 amps with the speed turned to maximum, if the speed is reduced then the maximum current at the power supply will be porportionately reduced so as to maintain the current at the motor at a maximum of 5 amps.

4. The drive should preferable be mounted to an aluminum chassis or frame, or a aluminum heat sink. Drive heat rise is greatest at high currents, low duty cycles and continuous operation. If the application is 100% duty cycle, with normal indoor ambient temperature, the current is low compared to the rated current, or if the application is intermittent with on times for example of 1 minute and off times of at least 1 minute, then a heat sink will probably not be necessary. For high ambients forced air cooling directed at the board can help. For long term reliability, it is recommended that sufficient cooling be provided to prevent the hottest spot on the board from exceeding 100C. This can be checked with a portable infrared thermometer

5. Reversing direction while the motor is spinning (4 quadrant operation) should be normally be avoided. If the motor is running at maximum speed and the direction is reversed then currents as high as twice the stall current of the motor can flow damaging the drive and motor. The energy stored in the load will be dumped into the power source for the drive. If this is a battery the battery will be recharged, however if a power supply is used internal diodes will prevent the energy from transfering to the AC line power and instead the output capaciator of the power supply will be charged up. This can result in destruction of the power supply and or the drive due to overvoltage. If the application requires 4 quadrant operation then a shunt resistor and relay must be added to the power supply to absorb the regerative energy and prevent power supply overvoltage. Also the speed input should be set to zero and the direction input modulated between forward and reverse to controll decelleration. The programed decelleration rate should be no more then the maximum acceleration rate as determined by the power supply current limit and motor Kt.

Connecting other brands of motors

Make sure that the motor uses 120° halls. Hook up halls and sensors in the sequence indicated on the motor information. If the motor runs in the opposite direction desired either use the direction terminal to change direction or switch Phase A with Phase B and Hall HC with Hall HA.