

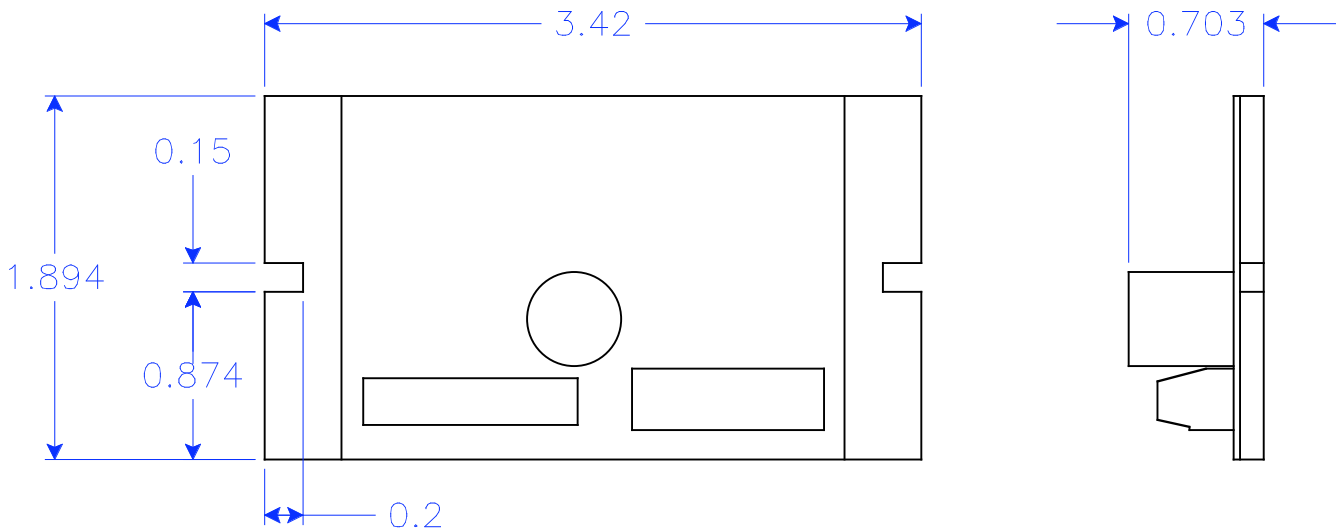
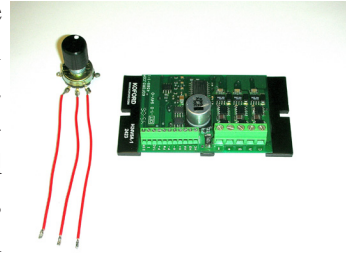
5 amp hall sensor brushless motor drivers

Small, compact, no programming or set up required. Up to 99% efficiency. The full power supply voltage is applied to the motor for maximum performance (unlike most drives that only supply 94% of the input voltage). No inductors required for slotless or ironless motors.

Table of Contents

H48V5A-5 Digital closed and open loop drives with speed and direction inputs, and tach output.....	2
Speed pot with leads.....	5
Technical notes and application information.....	6

Ultra high efficiency miniature hall sensor drive with 37khz pwm frequency, designed for use with stand alone, or external input operation. The drive has no minimum inductance and will operate slotless or ironless brushless motors without the need for bulky, cumbersome inductors. For stand alone operation the speed pot with wires and knob should be ordered. In this configuration once power supply, motor and speed pot are connected the motor can be operated without the need for any adjustments, set up or programming. If reversible operation is required a SPDT switch can be added between DR and P-. For external speed control 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 than 1mA) or a 1 khz to 100k Hz square wave with variable duty cycle. The direction is controlled by 0v (counterclockwise) or 5v (clockwise) to the DR input. Directions is as viewed from the motor mounting surface. If the motor speed is turned to zero the motor will coast. If braking is required use the -3 drive which follows in the catalog. Motor rpm can be measured if needed by connecting a multimeter or scope between TC and P-. For a 2 pole motor 100 hz=2,000 rpm, for a 4 pole motor 100hz= 1,000 rpm. The drive weighs 1.9 oz. The operating temperature range is -55 to 105C, however operating at an ambient below 60C will increase drive life.



Terminal block positions (motor lead hook up for Koford motors)

DR=leave unconnected for forward direction, connect to P- for reverse

P+=connect to one side of pot (5.0v)

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

BK=no connection

TC=Tach

Ordering information:

please send the order to mail@koford.com

Part number

H48V5A-5A Open loop drive

H48V5A-5F Closed loop drive 5k rpm 2p, 2.5k rpm 4p, 1.25k rpm 8p

H48V5A-5B Closed loop drive 10k rpm 2p, 5k rpm 4p, 2.5k 8p

H48V5A-5C Closed loop drive 20k rpm 2p, 10k rpm 4p, 5k 8p

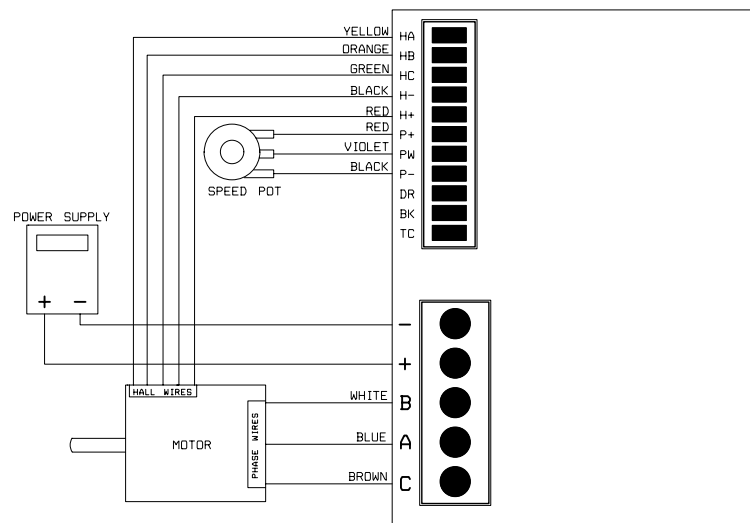
H48V5A-5D Closed loop drive 40k rpm 2p, 20k rpm 4p, 10k 8p

H48V5A-5E Closed loop drive 80k rpm 2p, 40k rpm 4p, 20k 8p

P1 Speed pot, with knob and leads (info on pg. 5)

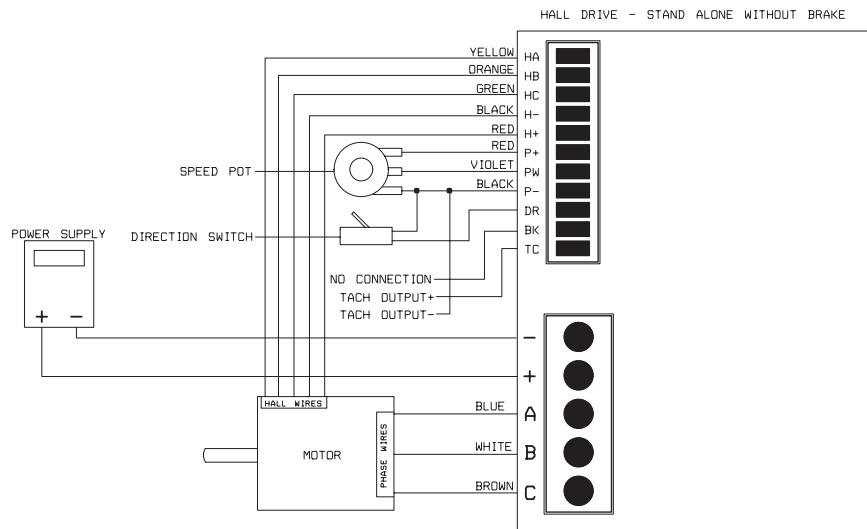
Basic configuration

Rotation for Koford motors is clockwise as viewed from the motor mounting surface. If only rotation in the counterclockwise direction is needed, connect a jumper between DR and P-.



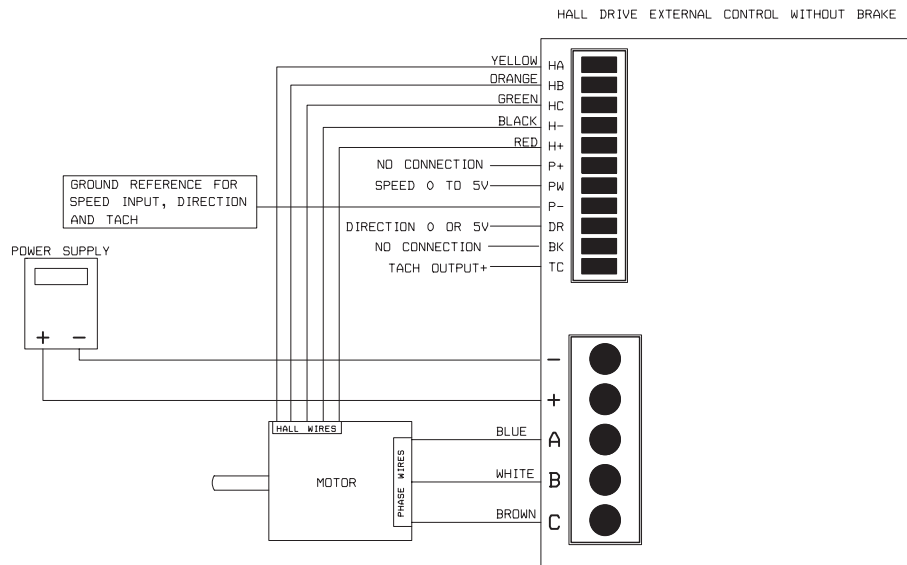
Stand alone operation with direction

Direction switch not needed if only rotation in one direction is needed, use Basic configuration shown above in that case.

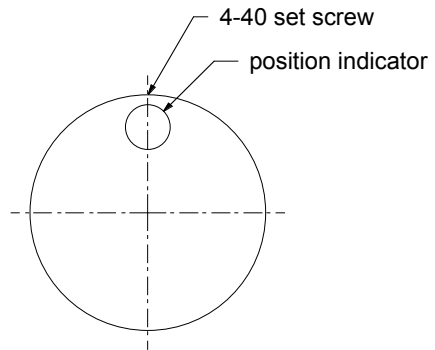
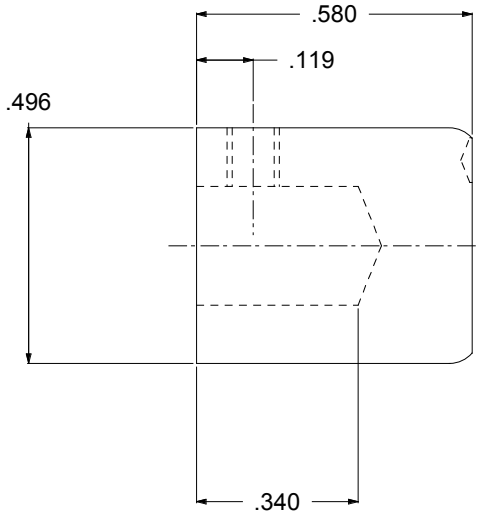
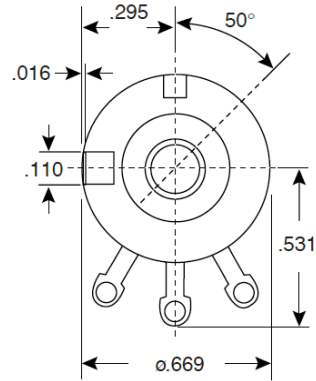
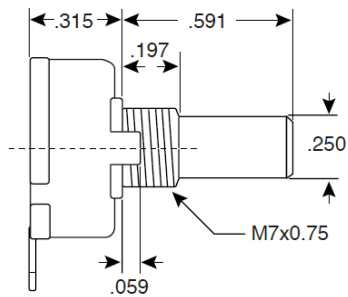
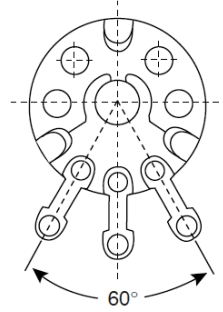
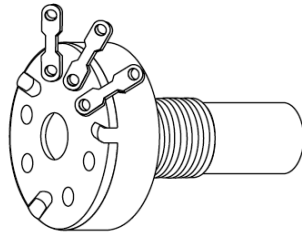


External control

Rotation for Koford motors is clockwise as viewed from motor mounting surface, counterclockwise if 0v is applied to DR, and clockwise if 5v is applied.



SPEED POT AND KNOB



Leads are 3.440" long stranded 22 gauge with TFE insulation.

Notes

1. These drives operate any brushless motor that has 120° hall (the standard type). Other names for brushless motors are Brushless DC (BLDC), Permanent Magnet AC (PMA), Permanent Magnet Synchronous. Despite the use of varying names these motors all work the same and these drives will operate any of them.
2. When using a microcontroller to operate the drive a 5 volts output should be used and the pwm frequency should be 1Khz or more, Up to 8kHz a RC filter should be used between the micro and the drive to filter the signal.
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 slightly above 5 amps with the speed turned to maximum, if the speed is reduced then the maximum current at the power supply will be proportionately reduced so as to maintain the current at the motor at a maximum of 5 amps. For example if the motor speed is reduced by 50% then the maximum power supply current will be reduced by about 50% also but the motor will put out the same torque.,
4. The drive should preferably 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, or if 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 mounting the drive to aluminum 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. Direction change on digital drive models is allowed only when the speed command is set to zero. For applications requiring rapid reversing the speed should be set to zero for long enough to allow the motor to come nearly or completely to a stop before changing the direction command. Setting the speed to zero while the motor is spinning will brake the motor. The direction on analog drives can be changed even when the speed command is set to a non zero value but this is not recommended to prevent drive/motor damage.
6. When connecting other brands of motors make sure that the motor selected 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 input to change direction or switch Phase A with Phase B and Hall HC with Hall HA. If the motor information uses different designations for the hall leads or if the motor is hooked up but does not run or pulls high current even when unloaded try switching the hall leads with each other until you find the correct combination.
7. Although the drive will function up to 200,000 rpm with a 2 pole motor, hall motors work poorly at such speeds. Above 100,000 rpm with a 2 pole motor or 50,000 rpm with a 4 pole motor the efficiency of a hall motor starts to drop off compared to running the same motor with a sensorless drive. Above 100,000 rpm with a 2 pole motor and 50,000 rpm with a 4 pole motor the loss in efficiency is excessive and hall motors are not recommended. This is due to limitations of the halls themselves, in part due to the timing being mechanically fixed rather than changing with speed and load as with a sensorless motor and in part due to the switching delay of hall sensors. The performance of hall motors at high speed can be improved by advancing the timing of the motor as long as the motor runs in one direction only. Hall motors are necessary for operation down to zero speed or for positioning applications.