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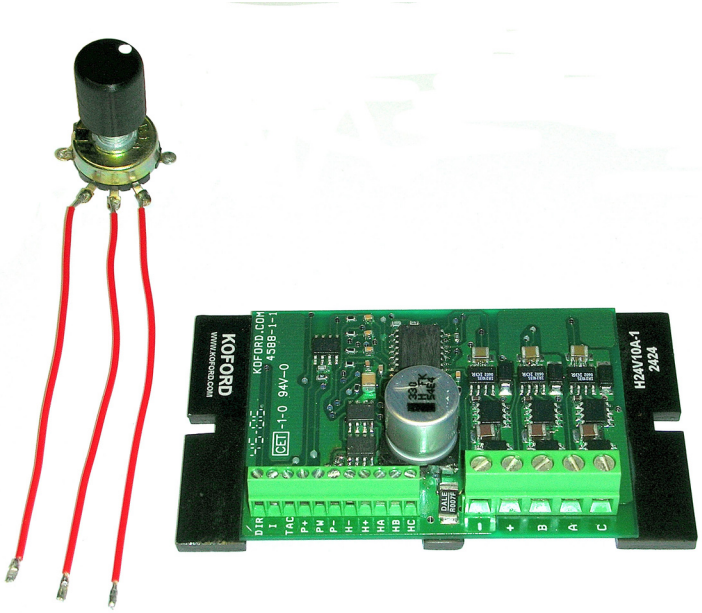
ENGINEERING, LLC



10 amp hall sensor motor drivers

Small, compact, no programing or set up required. Up to 99% efficiency, no inductors required for slotless or ironless motors.

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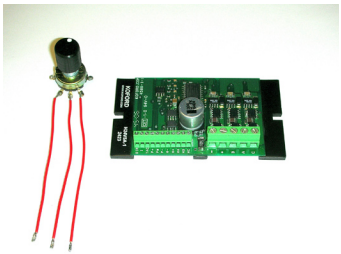
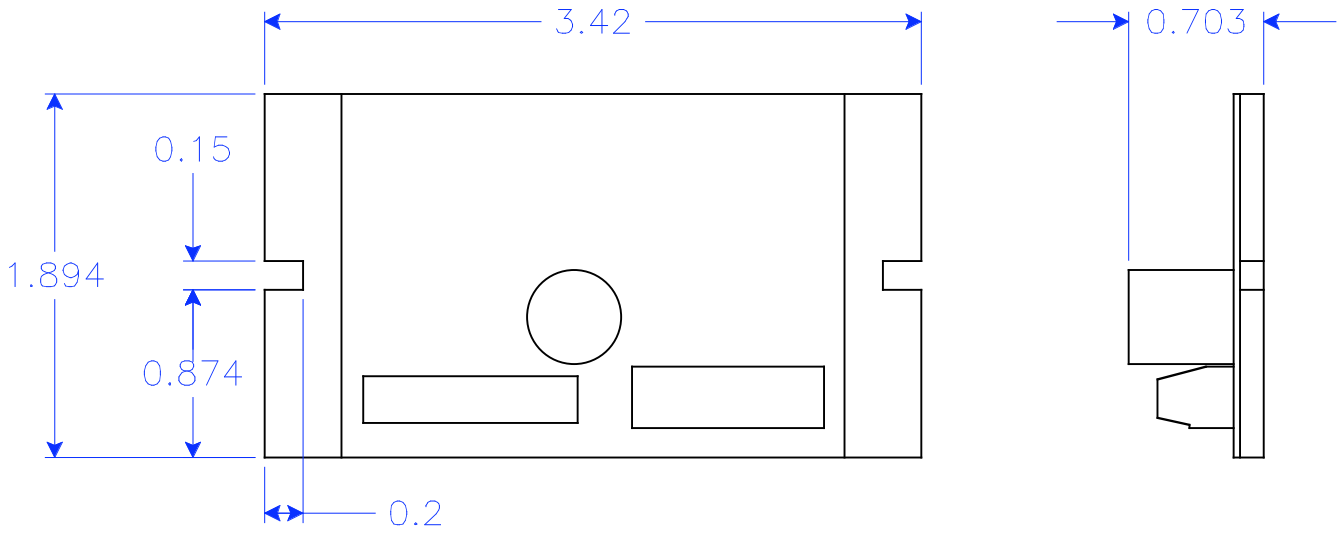
H24V10A hall sensor digital closed loop speed control motor driver with brake 10A 12-32V



Ultra high efficiency miniature hall sensor drive with 37k 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. The drive can be used with or without the brake function which slows the motor with no external resistor required. 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 programing. If reversible operation is required a SPDT switch can be added between Dir 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 then 1mA) or a 1 khz to 100k Hz square wave with variable duty cycle. The TAC output provides a 5v square wave with a 50% duty cycle. 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. Brake is off if the BRK is left disconnected. To apply brake connect BRK to P+ with a swich, or use an external 5v signal connected between BRK and BG. Motor rpm can be measured if needed by connecting a multimeter or scope between HA and H-. For a 2 pole motor 100 hz=6,000 rpm, for a 4 pole motor 100hz= 3,000 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)
DIR=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
BRK=brake off 0v or if left disconnected, 5v= on)
BG=ground reference for brake and speed input

Ordering information:

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

Part number:

H24V10A-3A Open loop drive with brake
H24V10A-3B Closed loop drive with brake 10k rpm 2p, 5k rpm 4p, 2.5k 8p
H24V10A-3C Closed loop drive with brake 20k rpm 2p, 10k rpm 4p, 5k 8p
H24V10A-3D Closed loop drive with brake 40k rpm 2p, 20k rpm 4p, 10k 8p
H24V10A-3E Closed loop drive with brake 80k rpm 2p, 40k rpm 4p, 20k 8p

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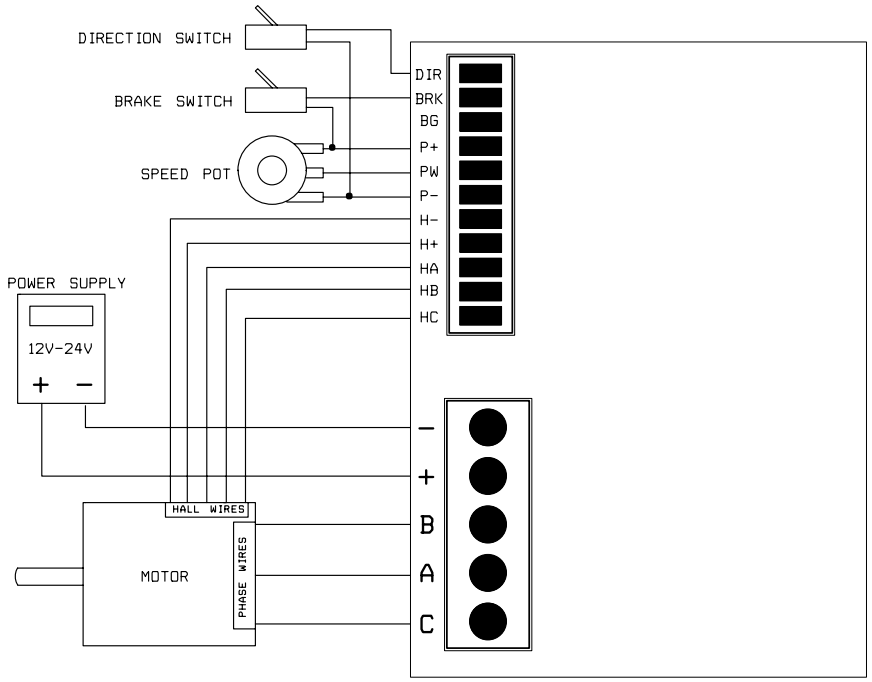
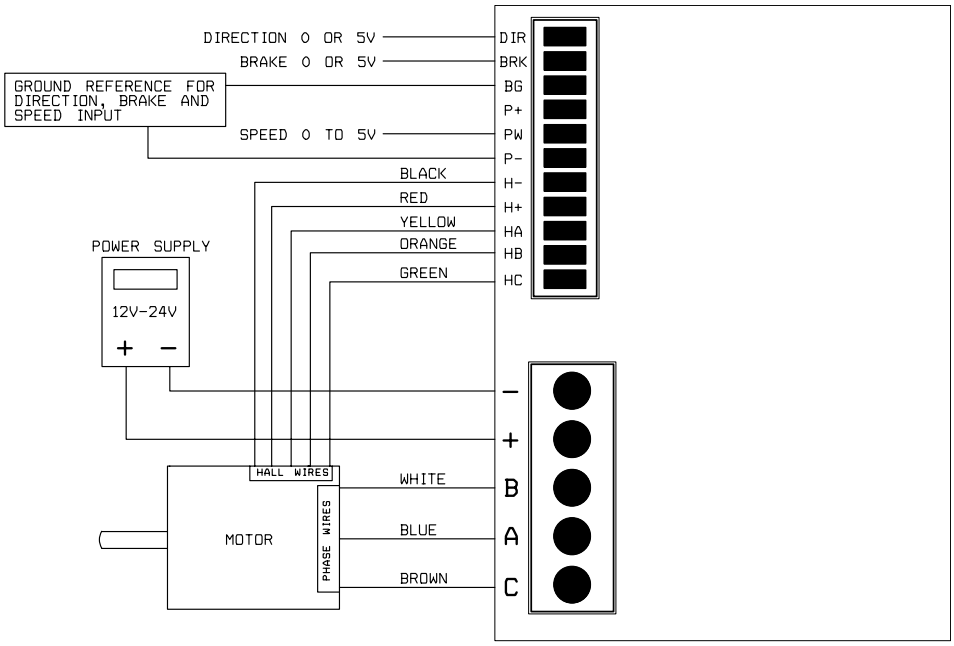
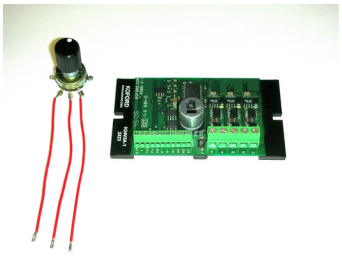
Stand alone operation with direction and brake



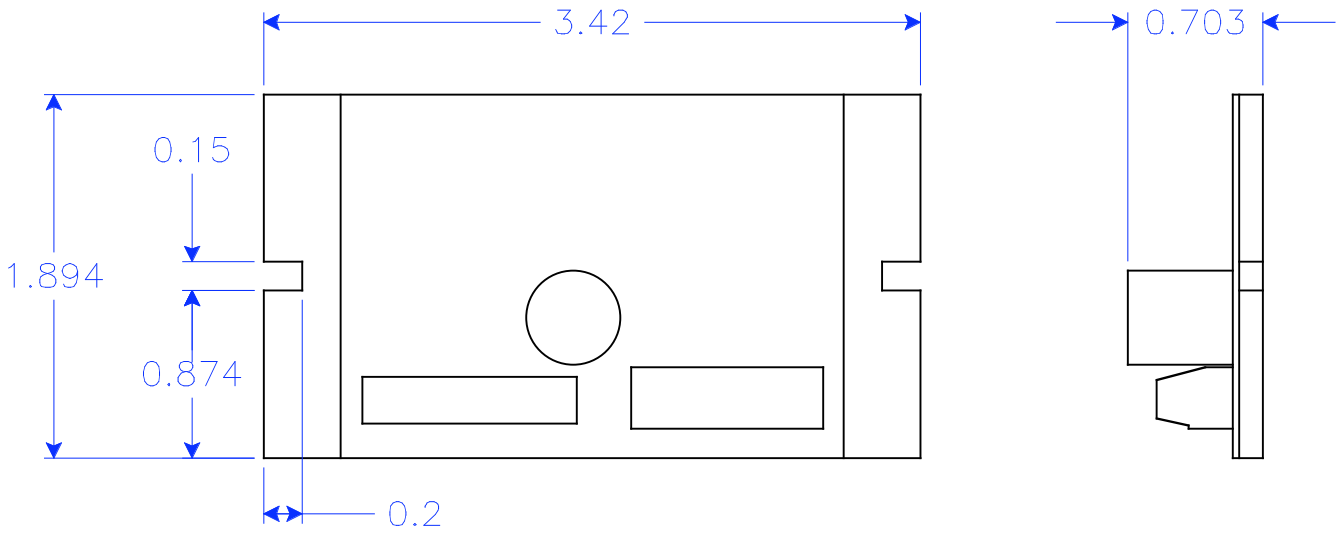
External control



H24V10A hall sensor digital closed loop speed control motor driver with overtemp 10A 12-32V



Ultra high efficiency miniature hall sensor drive with 37k 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. Designed for use with Koford motors with a thermistor, it shuts down the motor if the winding temperature exceeds 150C. Once the problem that caused the overtemperature has been corrected, the power can be switched off and then on to restart the motor. For stand alone operation the optional speed pot 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 programing. If reversible operation is required a SPDT switch can be added between Dir 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 then 1mA) or a 1 khz 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 5v square wave with a 50% duty cycle. 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. Motor rpm can be measured if needed by connecting a multimeter or scope between HA and H-. For a 2 pole motor 100 hz=6,000 rpm, for a 4 pole motor 100hz= 3,000 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)
DIR=leave unconnected for forward direction, hook 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
T1=first 5k thermistor lead
T2=second 5k thermistor lead

Ordering information:

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Part number:

H24V10A-4A Open loop drive with overtemperature protection
H24V10A-4B Closed loop drive with overtemperature protection 10k rpm 2p, 5k rpm 4p, 2.5k 8p
H24V10A-3C Closed loop drive with overtemperature protection 20k rpm 2p, 10k rpm 4p, 5k 8p
H24V10A-3D Closed loop drive with overtemperature protection 40k rpm 2p, 20k rpm 4p, 10k 8p
H24V10A-3E Closed loop drive withovertemperature protection 80k rpm 2p, 40k rpm 4p, 20k 8p

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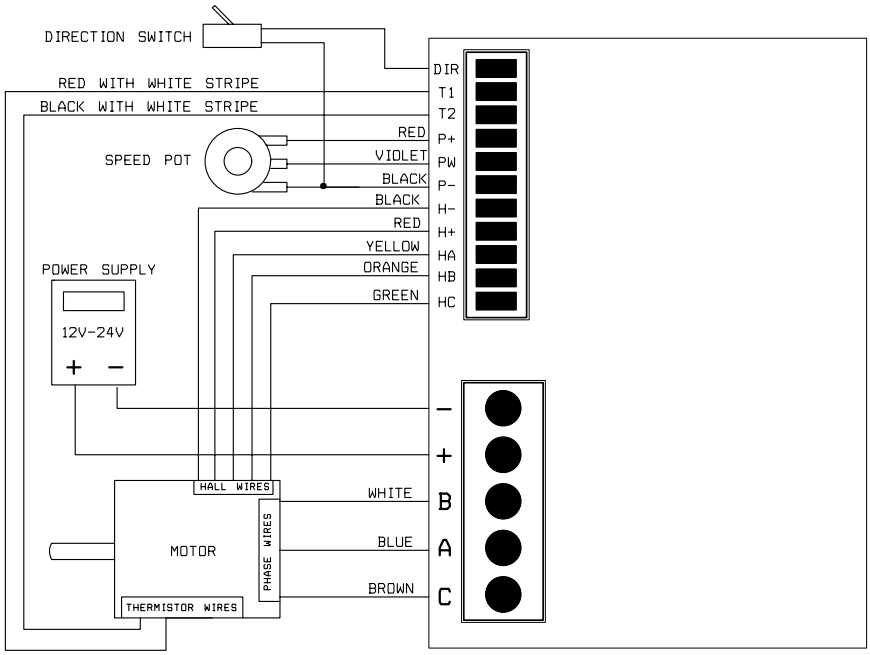
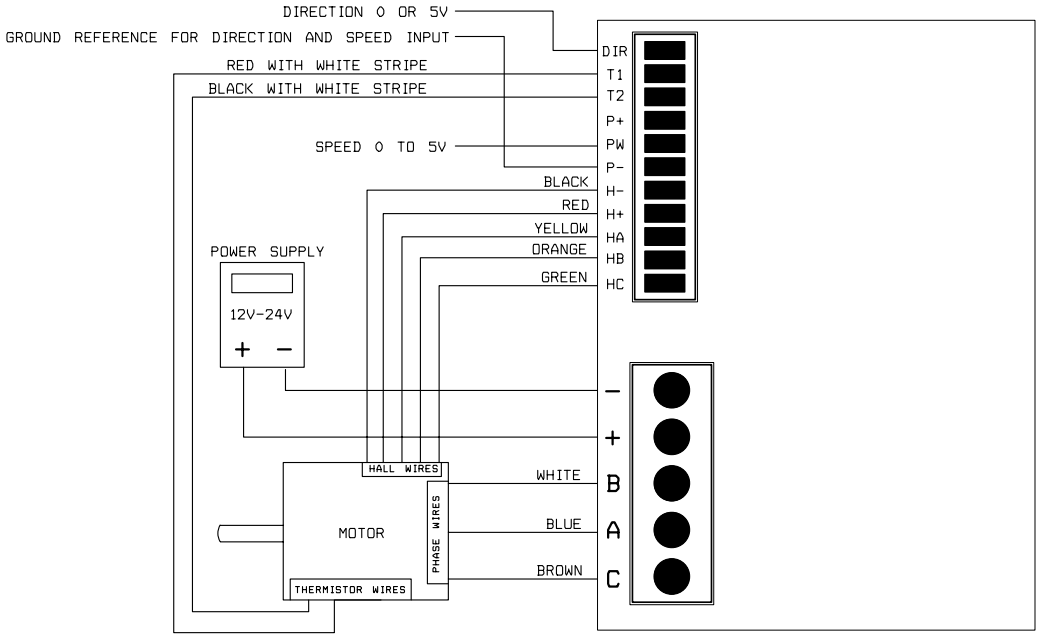
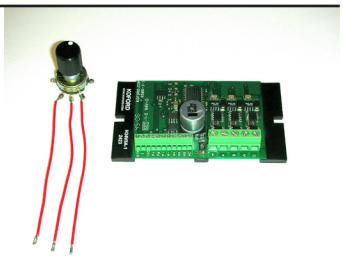
Stand alone operation with direction and overtemperature protection



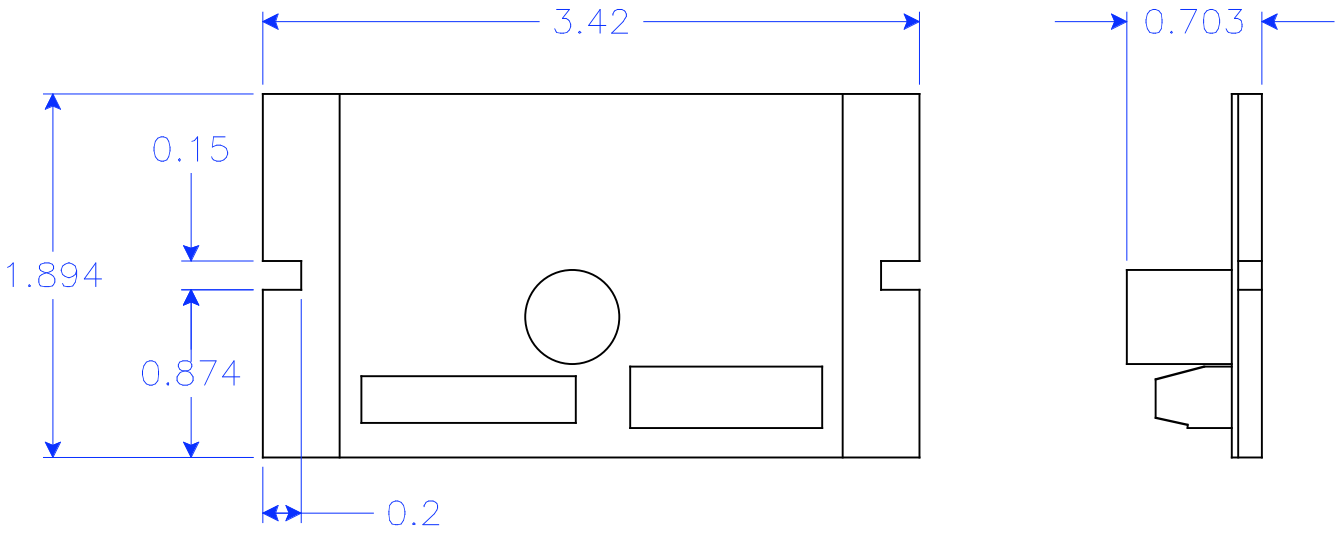
External control



KOFORD ENGINEERING, LLC H24V10A hall sensor motor driver 10A 12-32V



Ultra high efficiency miniature hall sensor drive with 56k pwm frequency, designed for use with stand alone operation with a speed pot or with an external control voltage. The drive has no minimum inductance and will operate slotless or ironless brushless motors without the need for bulky, cumbersome inductors. Two types are available, a full featured -1 model which include tach and current output, with speed control and direction input, a lower cost -2 which deletes the tach and current output. For stand alone operation the speed pot must 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 1 kHz to 100k Hz square wave with variable duty cycle. The speed loop can be closed externally if required using speed information from an encoder or the TAC output from the drive which is 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. Direction is controlled by 0v (reverse) or 5v (forward) to the DIR input. The current output is a DC voltage at .25v 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. 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)
DIR=leave unconnected for forward direction, hook to P- for reverse
I=current output, .25V = 1A of motor current
TAC=tach/encoder output 6 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:

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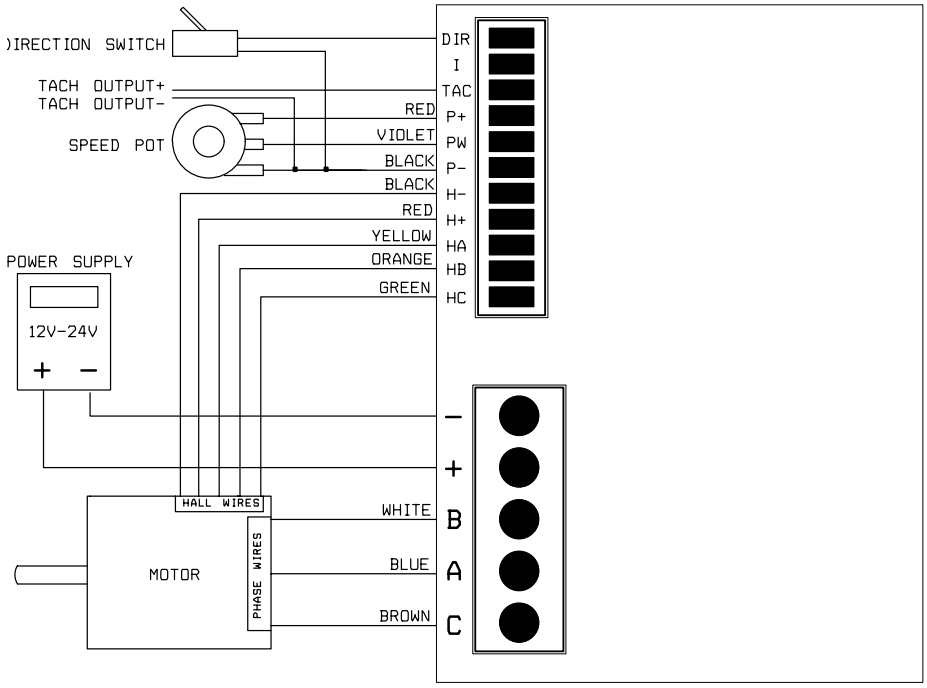
Part number:

H24V10A-1 Open loop drive with tach and current output

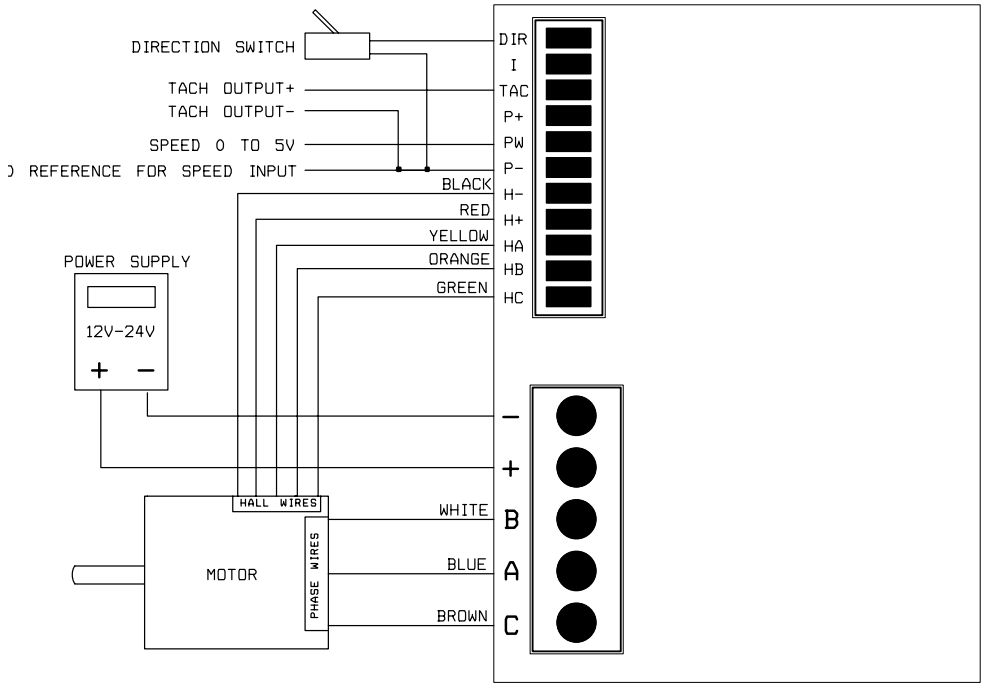
H24V10A-2 Open loop drive

P1 Speed pot, with knob and leads (info on pg. 10)

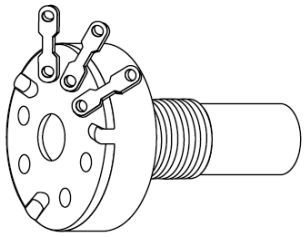
Stand alone operation with direction and overtemperature protection

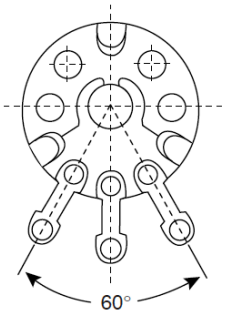


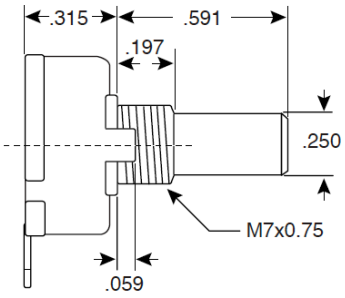
External control

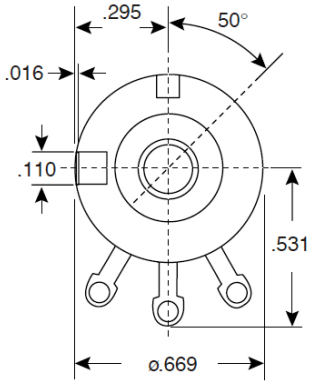


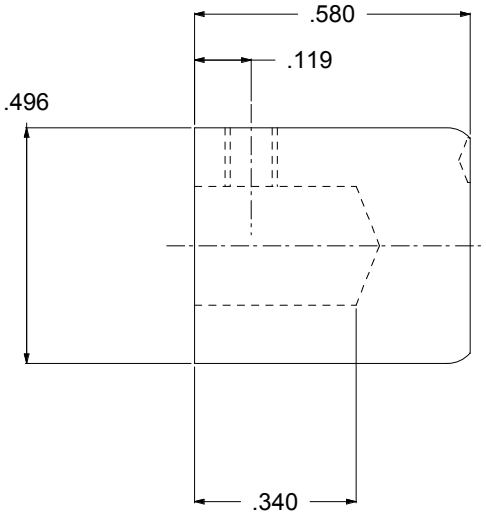
SPEED POT AND KNOB

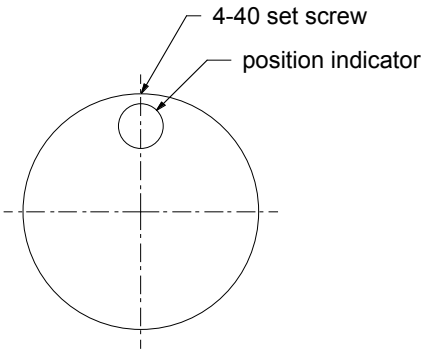












Leads are 3.440" long stranded 22 gauge with TFE insulation.

Notes

1. 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.

2. The current limiting of the drive limits the current delivered to the motor to slightly above 10 amps, this means that the current at the power supply will reach a maximum of alightly above 10 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 10 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.,

3. 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

4. Reversing direction while the motor is spinning should be normally be avoided. If the motor needs to be slowed use the brake function rather then reversing the motor direction. 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 stressing 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.

5. 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.

6. Although the drive will function up to 200,000 rpm with a 2 pole motor, hall motors work poorly at such speeds. Above 60,000 rpm with a 2 pole motor or 30,000 rpm with a 4 pole motor the efficiency of a hall motor drops off greatly compared to running the same motor with a sensorless drive. This is due to limitations of the halls themselves, in part due to the timing being mechanically fixed rather then changing with speed and load as with a sensorless motor and in part due to the switching characteristics 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.