PUCK® P3™ FEATURES

- High-speed CANopen communication with software-controllable termination resistor
- 4 or (optional) 5-wire bus topology: 2-wire CAN, servomotor power 12-50 vdc, Ground (Logic power optional)
- Up to 31 controllers/bus
- Built-in magnetic encoder
- 5- and 3.3-vdc auxiliary outputs
- Integrated current sensor
- Space-vector commutation
- 32-bit floating-point processor
- Low torque ripple
- Quiet, fanless operation
- Internal temperature sensors
- In-system field-upgradeable firmware
- Digital Hall-effect feedback
- Adjustable PWM frequency
- Servomotor-temperature sensor hook
- Dual analog inputs (16-bit)
- Up to 4 digital I/O
- External encoder capable: SPI or quadrature
- SPI master peripheral support

SPECIFICATIONS

Input voltage: Min 12V, Max 50 vdc

Drive current: Continuous 1.5A, Peak 3A

Output power: Continuous 70W, Peak 150W

Dimensions: Width 18mm, Height 7mm

Mass: Total 4g

Absolute encoder: Rotary 4,096 cts/rev

Bus length: Max 20m

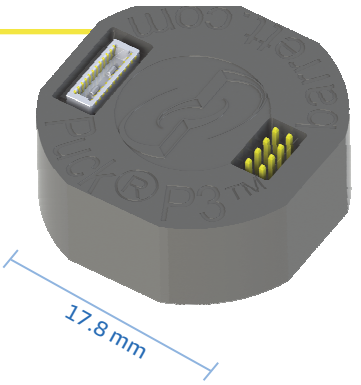
Operating temperature: Min 0°C, Max 100°C

PATENTS

US Patent# 10,148,155
US Patent# 7,893,644
US Patent# 7,854,631
US Patent# 7,511,443

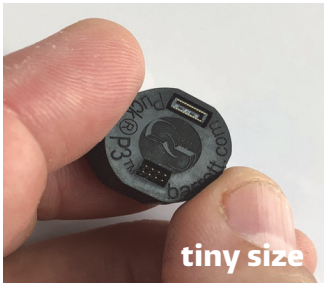
with international equivalents and more patents pending.

Puck® P3™



So many features, so little size...

Barrett's ultra-miniature, high-performance brushless servomotor controller makes complex multi-actuator designs simple! It is a truly sophisticated and revolutionary servomotor controller which is easily integrated into any application requiring high-performance, maximum power efficiency, low mass, and compact size.



BIG FUNCTIONALITY, COMPACT FORM

The Puck® P3™ is a networkable high-performance brushless single-axis motion controller and amplifier with an integrated encoder and precision current sensor. It controls the torque output of brushless servomotors with state-of-the-art space-vector commutation and low torque ripple. You can also command velocity, position, or give the controller a target position to reach using its built-in trapezoidal velocity controller.

P3™ (Puck®, version 3) is the product of two decades of design, development, testing, and refinement of the servomotor controllers used in our own robots.

With a volume of only 1.9 cm^3 and a total weight of only 4 grams, the Puck® P3™ is designed to replace a standard motion controller and amplifier while taking up less space than a typical encoder. When mounted directly onto the servomotor body, the close proximity of the controller eliminates encoder-to-controller wiring issues encountered with standard motion-control setups such as wire routing, connectors, signal degradation, EMI, I^2R power losses, and cable bulk.

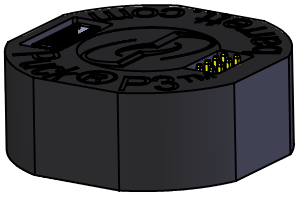
Up to 31 P3s may be networked together on a single, easy to manage, 4 or (optionally) 5-wire bus. Two wires are used for robust, high-speed industry-standard CANopen communications. One wire supplies servomotor power, one wire is a ground, and an optional wire supplies a separate logic power.

The P3 controls a wide range of servomotor voltages from 16 to 50 vdc without any reconfiguration. It is designed to command a smooth, continuous torque, even when the input voltage is unstable.

20191022 Revision: AG.00

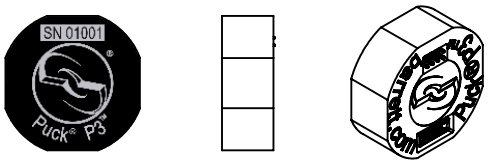
Barrett Puck® P3™ Motor-Interface Board and Magnet-Mounting Specifications

This page contains Motor-Interface Board (MIB) specifications for Barrett Technology's Puck P3 module. The MIB is designed by the customer using the guidelines shown below. A ∅6 x 2.5mm magnet with a radial N-S field attached to the rotating shaft of the motor at the distance specified. Contact Barrett for design assistance.

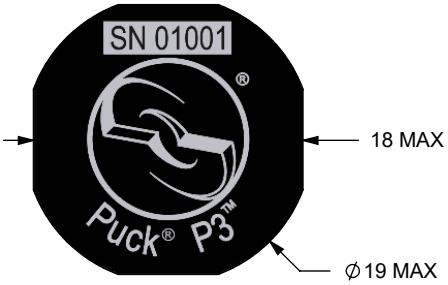


VIEW 1

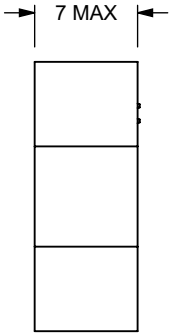
VIEW 2



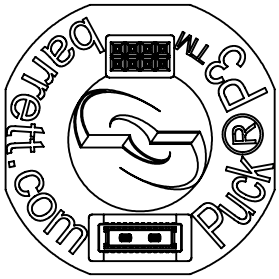
TRUE SIZE -- SCALE 1:1



BACK OF P3

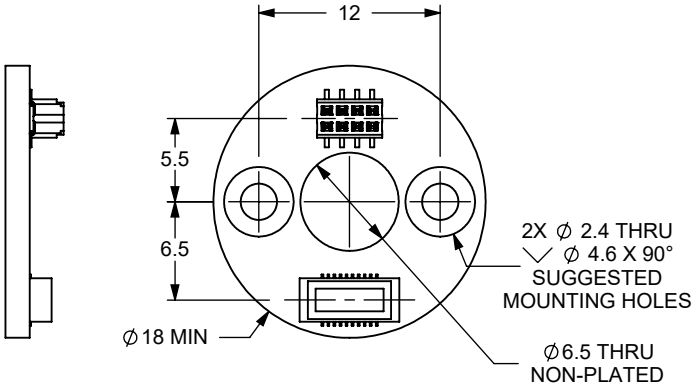


EDGE OF P3

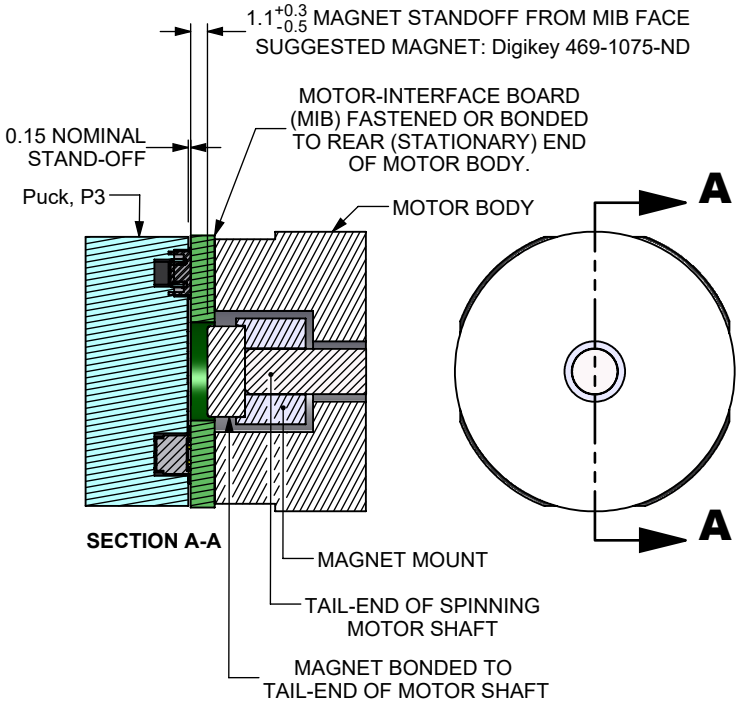


FRONT OF P3 (FACES MOTOR)

MINIMUM RECOMMENDED SIZE OF MOTOR-INTERFACE BOARD (MIB)



SEE SHEET 3 FOR PINOUTS
FOR ELECTRICAL I/O, ADDITIONAL BOARD SPACE MAY BE NECESSARY



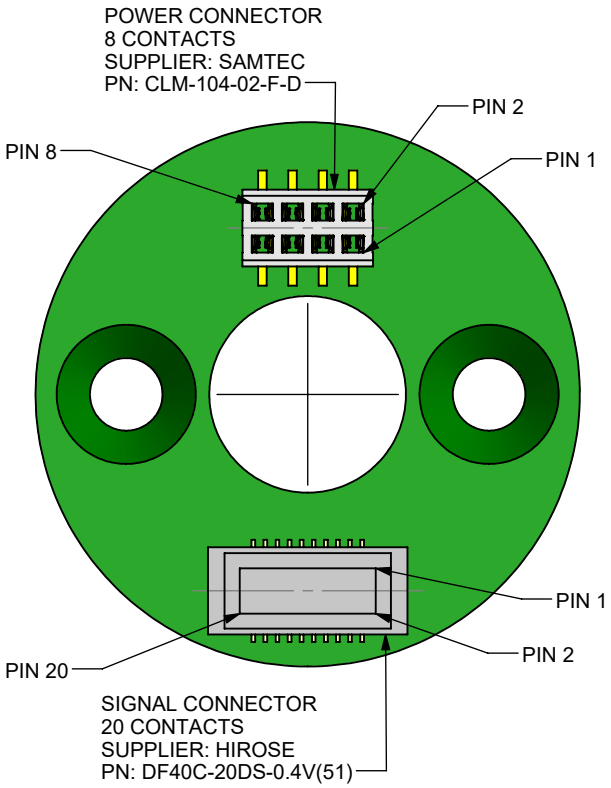
All dimensions in mm
Scale: 2x

Motor-Interface Board Guidelines

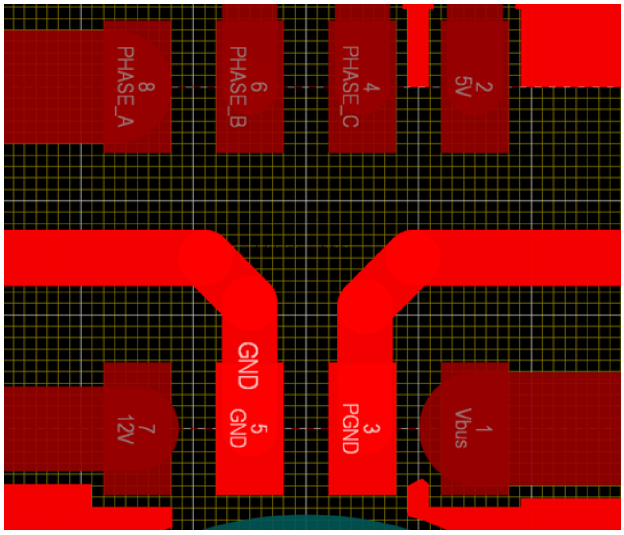
This page contains Motor-Interface Board (MIB) specifications for Barrett Technology's Puck P3 module. The MIB is designed by using the guidelines shown below. Contact Barrett for design assistance. **Bold** contact numbers are mandatory connections

Power Connector on Interface Board			
Pin No.	Name	Type	Description
1	**MotorV+**	Power	Motor power input
2	5V_Out	Power	5V output from internal switching regulator
3	**MotorGnd**	Power	Motor power return
4	**PhaseC**	Motor Driver	Output to motor phase C
5	**Logic_GND**	Power	Digital ground
6	**PhaseB**	Motor Driver	Output to motor phase B
7	**Logic_12V**	Power	12V digital power input
8	**PhaseA**	Motor Driver	Output to motor phase A

Signal Connector on Interface Board			
Pin No.	Name	Type	Description
1	**CAN_Lo**	Digital I/O	Low side of differential CAN
2	**CAN_Hi**	Digital I/O	High side of differential CAN
3	~Reset	Digital Input	Active-low reset Factory-use only
4	I2C_Data	Digital I/O	I2C Data
5	SPI_MOSI	Digital I/O	SPI MOSI
6	I2C_Clock	Digital I/O	I2C Clock
7	SPI_MISO	Digital I/O	SPI MISO
8	ADC1 DAC1_OUT	Analog I/O	12-bit 3.3V analog input 1 12-bit 3.3V analog output 1
9	SPI_Clock	Digital I/O	SPI Clock
10	QuadIdx JTAG_TMS	Digital I/O	Quadradure encoder IDX JTAG mode select
11	Logic_GND	Power	Digital ground
12	3.3V_Out	Power	3.3V output from internal LDO
13	QuadA DI/O3	Digital I/O	Quadrature encoder input A I/O pin 3
14	SPI_CS DI/O2	Digital I/O	SPI chip select line I/O pin 2
15	HallB JTAG_TDI	Digital I/O	Hall input B JTAG data input line
16	DI/O1	Digital I/O	I/O pin 1
17	HallC JTAG_TDO	Digital I/O	Hall input C JTAG data out
18	QuadB DI/O4	Digital I/O	Quadrature encoder input B I/O pin 4
19	HallA JTAG_TCLK	Digital I/O	Hall input A JTAG Clock
20	ADC2	Analog Input	12-bit 3.3V analog input 2



MOTOR-INTERFACE BOARD (MIB)
ELECTRICAL CONNECTIONS



PCB Layout Note:
P3 pins interfacing with the power connector will create contact with traces routed directly under them. To avoid unintentional shorts, enforce keep-out areas underneath where these pins land, and route traces from pins 3 and 5 out from under the connector through its direct center with a trace width no greater than 0.5mm, as shown to the right.