Controlled by
Galil Motion Control

Product Description

The DMC-30019 is a customized controller/driver for use with *Piezo LEGS* motors from *PiezoMotor*. The unit is built on the DMC-30000 Pocket Motion Controller Series, which is latest generation single-axis motion controller from *Galil Motion Control, Inc*.

The motion controller operates stand-alone or can be networked to a PC via Ethernet. Features include PID compensation with velocity and acceleration feed forward, program memory with multitasking for concurrent execution of four programs, and uncommitted optically isolated inputs and outputs for synchronizing motion with external events. Modes of motion include point-to-point positioning, jogging, contouring, PVT, electronic gearing and electronic cam.

Like all Galil motion controllers, these controllers use a simple, English-like command language which makes them very easy to program. *PiezoTools* software further simplifies system set-up with real-time display of position and velocity information.

Features of DMC-30019

- Single-axis motion controller with motor amplifier for Piezo LEGS, all in compact enclosure.
- Two daisy-chainable Ethernet 10/100 Base-T ports. One 115kbaud RS232 port.
- Ethernet supports multiple masters and slaves. TCP/IP, UDP and Modbus TCP master protocol for communication with I/O devices.
- Encoder feedback up to 15 MHz. Quadrature, SSI, BiSS, and sinusoidal encoder options. Main and auxiliary encoder inputs.
- PID compensation with velocity and acceleration feed forward, integration limits, notch filter and low-pass filter.
- Modes of motion include jogging, point-to-point positioning, contouring, PVT, electronic gearing and electronic cam.
- English-like commands executable by controller. Includes conditional statements and event triggers.
- Non-volatile memory for programs, variables and arrays. Concurrent execution of four programs.
- Optically isolated forward and reverse limit inputs and homing input.
- 8 uncommitted, isolated inputs and 4 isolated outputs.
- High speed position latch and output compare.
- 2 uncommitted analog inputs and 1 analog output.
- DMC-30019-01:   3.9 × 5.0 × 1.5 (inch)
                              99 x 127 x 37 (mm)
- Control architechture by *Galil Motion Control, Inc.* Driver and assembly by *PiezoMotor*

Ordering information	
Controller/Driver	
DMC-30019-01	Pocket Motion Controller including amplifier for Piezo LEGS; 1-axis -01 = BOX + SER options as defined by Galil
105787-HK-ALL	48V 0.5A Power Supply
105791	USB to RS232 converter

Specifications

System Processor
- RISC-Based processor with DSP functions

Communications Interface
- Two Ethernet 10/100 BASE-T ports. One RS232 port up to 115kbaud. Commands are sent in ASCII. A binary communication mode is also available as a standard feature. Daisy-chain Ethernet – no external hub required.

Modes of Motion
- Point-to-point positioning
- Position Tracking
- Jogging
- Electronic Gearing
- Electronic Cam
- Contouring
- Teach and playback
- PVT

Memory
- Program memory size – 1000 lines × 40 characters
- 254 variables
- 3000 array elements in up to 6 arrays

Filter
- PID (proportional-integral-derivative) with velocity and acceleration feed forward
- Notch and low-pass filter
- Velocity smoothing to minimize jerk
- Integration limit
- Offset adjustments

Kinematic Ranges
- Position: 32 bit (±2.15 billion counts per move; automatic rollover; no limit in jog or vector modes)
- Velocity: Up to 15 million counts/sec
- Acceleration: Up to 67 million counts/sec^2

Uncommitted I/O
- 8 isolated inputs
- 4 isolated outputs
- 2 analog inputs; 0–5 Volts, 12-bit ADC (16-bit option configurable ± 10 V)
- 1 uncommitted analog output ±10 V, 16-bit DAC

High Speed Position Latch
- Latches encoder position

Dedicated Inputs
- Main encoder inputs
    Channel A, A-, B, B-, I, I- (±12 V or TTL)
- Auxiliary encoder inputs
- Forward and reverse limit inputs – isolated
- Home input – isolated
- High-speed position latch input – isolated

Dedicated Outputs
- Analog motor command output with 16-bit DAC resolution
- Error output
- Amp enable
- High-speed position compare output

Minimum Servo Loop Update Time
- 125 microseconds

Maximum Encoder Feedback Rate
- 15 MHz

Maximum Stepper Rate
- 3 MHz

Power
- DMC-30019: 48 VDC (±3%)

Drive Specifications
- DMC-30019: 0-44 VDC, 4 phases

Environmental
- Operating temperature:0–70ºC
- Humidity:20–95% RH, non-condensing

Mechanical
- DMC-30019-01:   3.9 × 5.0 × 1.5 (inch)
                   99 x 127 x 37 (mm)

Connectors
- 44-pin HD Female D-sub – General I/O
- 15-pin HD Female D-sub – Encoder Input
- 5-pin JST or Molex – Motor Output
- 9-pin D-sub – Serial Communication
- 2x RJ45 – Ethernet Communications
- 2-pin Molex 70543 – Power
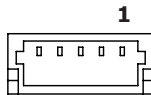- USB Mini type B – Amp Firmware Update

Connectors

Power

2-pin Molex 70543

1. +48 VDC (±3%)
2. Ground

Motor Output

5-pin JST or Molex

1. Phase 1
2. Phase 2
3. Phase 3
4. Phase 4
5. GND

Note: Several motor connectors available

2x JST BM05B-SRSS-TB
1x Molex 53047-0510

Encoder Input

D-sub 15-pin HD Female

1. Index+
2. B+
3. A+
4. Aux B+
5. Ground
6. Index-
7. B-
8. A-
9. Aux A-
10. Hall A
11. Aux A+
12. Aux B-
13. Hall B
14. Hall C
15. +5 V

Serial Communication

D-sub 9-pin

1. No connect
2. Transmit data – output
3. Receive data – input
4. No connect
5. Ground
6. No connect
7. Clear to send – input
8. Request to send – output
9. No connect

Ethernet Communication

2x RJ45

TCP/IP or UDP/IP protocols

Amplifier Firmware Update

USB Mini type B

General I/O Connector

D-sub 44-pin HD Female

1. Analog input 1
2. Analog output 2
3. NC
4. Error output*
5. Multi function 1-
6. Multi function 2+
7. Multi function 4-
8. Limit switch common
9. Home-isolated
10. Input 2 – isolated
11. Input 5 – isolated
12. Input 8 – isolated
13. Reset – isolated*
14. Output 2 – isolated
15. Output common OP0B
16. Analog Ground
17. Motor command / Analog output 1
18. +12 V
19. Amp enable
20. Ground
21. Multi function 2-
22. Multi function 3+
23. +5V
24. Reverse limit – isolated**
25. Input 1 – isolated
26. Input 4 – isolated
27. Input 7 – isolated
28. Abort – isolated
29. Output 1 – isolated
30. Output 4 – isolated
31. Analog input 2
32. -12V
33. Ground
34. Output compare
35. Multi function 1+
36. Multi function 3-
37. Multi function 4+
38. Forward limit – isolated**
39. Input common
40. Input 3 – isolated
41. Input 6 – isolated
42. Electronic lockout – isolated*
43. Output common OP0A
44. Output 3

Signal Description for Multi-functional Pins on General I/O Axis Connector		
Label	**Pin Number**	**BiSS or SSI Enabled**
Multi function 1+	35	Main Data+
Multi function 1-	5	Main Data-
Multi function 2+	6	Main Clock+
Multi function 2-	21	Main Clock-
Multi function 3+	22	Aux Data+
Multi function 3-	36	AuxData-
Multi function 4+	37	Aux Clock+
Multi function 4-	7	Aux Clock-

*Active low   **Configurable for active high or active low

150069-01

DMC-30019 Controller & Piezo LEGS Amplifier

The DMC-30019 contains a microstepping drive for operating a Piezo LEGS motor from PiezoMotor. The drive gives sub-nanometer resolution for a standard linear Piezo LEGS motor.

Piezo LEGS gives you direct drive with zero backlash, outstanding resolution, instant reaction, and high force in exceptionally compact envelopes. In combination with advanced motion control from Galil, Piezo LEGS is a perfect choice for high precision systems within for example semiconductor manufacturing or in applications for factory automation.

Piezo LEGS is nothing like an ordinary stepper motor. In fact, using the DMC-30019 Piezo LEGS controller is comparable to using the brushed/brushless servo motor version (Galil Motion Controller DMC-30012).

User Manual and Software Downloads

All documentation, *PiezoTools* software, and firmware updates can be downloaded from PiezoMotor's homepage.

Controller is set up like a servo motor, tuning the PID parameters to optimize performance. Please contact PiezoMotor for support and help getting started.

www.piezomotor.com