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Lower-Cost DC Power Input Microstepping Drive

Compumotor's new E-DC microstepping drive is designed for a 48VDC input power requirement and provides current up to 4.8 Amps peak of current to the motor.

Features

Performance

- Designed for use with motor inductance range of 0.2 mH–80 mH
- Three-state current control allows the drive and motor to run cooler and more efficiently than two-state drives
- Selectable resolution up to 50,800 steps/rev
- Auto standby reduces motor current (and heating) at rest
- Provides 0.2 Amps to 4.8 Amps (peak)
- Single 24-48 VDC power supply input
- Compatible with a variety of motors
- Six predefined current waveforms to optimize smoothness

Protection

- Optically isolated step and direction inputs
- Short circuit protected—phase-to-phase, and phase-to-ground
- Power dump circuitry to protect drive from regeneration caused by large inertial loads
- Self-test feature to verify proper system operation
- Overtemperature circuitry protects the drive from thermal damage

Physical

- Status/fault LED indicators to confirm proper operation
- ASIC and surface mount technologies minimize product footprint, overall package size, and increase product reliability
- Removable snap-on molded cover for convenient configuration and protection against contaminants
- Optically isolated fault output for embedded applications
- Heat plate design allows thermal dissipation through a suitable heat dissipating mounting surface
- Simplified, two-screw mounting
- Right-angle screw terminal allows side-to-side mounting or Eurorack compatibility
- Overall dimensions 5.0 x 3.6 x 1.6 in. (127 x 91 x 41 mm)
- Convenient configuration DIP switches
- Certified as UL-recognized component
- CE (LVD & EMC)

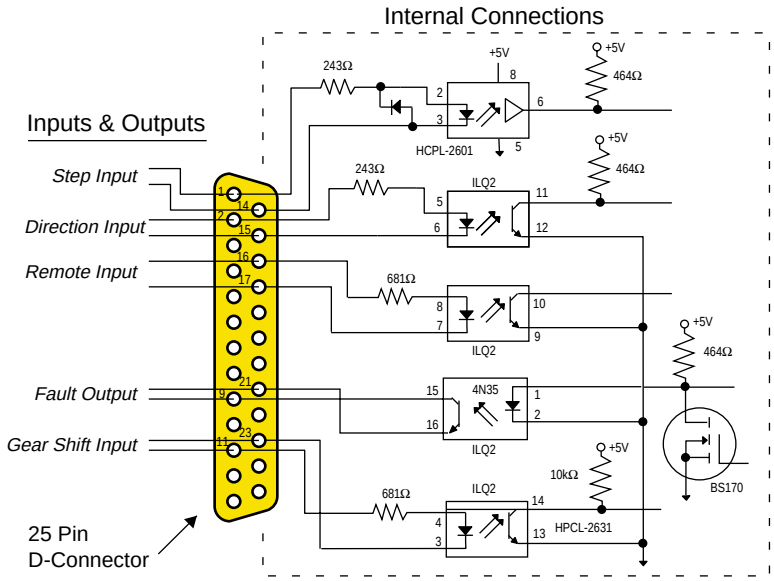
E-DC Drive Specifications

	Parameter	Value
Power Input		
	DC	24–48 VDC @ 2.0 Arms (motor dependent)
Performance		
	Accuracy	±5 arc min (0.0833°) typical. Unloaded-bidirectional with Compumotor supplied motors. Other motors may exhibit different absolute accuracy. ±1 arc min (0.0167°) typical/per each frictional load equal to 1% rated torque. Loaded-in addition to unloaded accuracy.
	Repeatability	±5 arc sec (0.0014°) typical. Unloaded-one revolution returning to start point from same direction.
	Hysteresis	Less than 2 arc min (0.0334°) unloaded-bidirectional.
	Resolution	16 selectable choices: 200, 400, 1000, 2000, 5000, 10000, 12800, 18000, 20000, 21600, 25000, 25400, 25600, 36000, 50000, 50800
	Waveform	Selectable. Allows waveform shaping for optimum smoothness or relative accuracy. Pure sine; -4%, -6%, -8%, -10% 3rd harmonic.
Amplifier		
	Type	20 kHz fixed frequency, variable duty cycle pulse width modulated (PWM) Current Controlled, bipolar chopper
	Number of Phases	2
	Output Current	0.2–4.8 amps current per phase peak (selectable)
	Drive Supply Voltage	24–48 VDC (dependent on external power supply)
	Standby Current Reduction	25%, 50%, or 75% of selected motor current
	Nominal Chopping Frequency	20 kHz
	Max Stepping Rate	2 MHz max pulse rate; 50 rps max speed
	Step Input	High-going pulse, 200 nsec min width; max pulse rate is 2 MHz; User-supplied driver for the step and direction inputs should be capable of providing a minimum of 6.5 mA to maximum of 15 mA
	Direction Input	Logic High = positive (CW) rotation—3.5–5.0V Logic Low = negative (CCW) rotation—0–0.4V User-supplied driver for the step and direction inputs should be capable of providing a minimum of 6.5 mA to a maximum of 15 mA. The direction input must be stable for at least 200 µsec before the drive receives the first pulse
	Fault Output	Open-Collector/Emitter, Vce = 70 VDC, Vce sat = 0.3 VDC, Ic = 10 mA (max) Maximum dissipation = 55 mW Conducting = normal operation Non conduction = drive fault
Protective Circuts		
	Short Circuit*	Phase-to-phase, phase-to-ground
	Undervoltage	If DC supply drops below 24 VDC
	Overtemperature*	The drive will fault if heat plate exceeds 55°C
Environmental		
	Drive Temp	Max allowable ambient temperature is 122°F (50°C). Fan cooling may be required if airflow is restricted. Max allowable heatplate temperature is 55°C.
	Humidity	0 to 95%, Non-condensing
Physical		
	Drive Dimensions	5.0 x 3.6 x 1.6 in (127 x 91 x 41 mm)
	Weight	12 oz
Motor		
	Type	Two-phase hybrid permanent magnet, 1.8°
	Number of Leads	4, 6, or 8
	Inductance Range	0.2 mH–80 mH

* Drive shuts down in conditions listed. Power must be cycled or drive reset to resume operations.

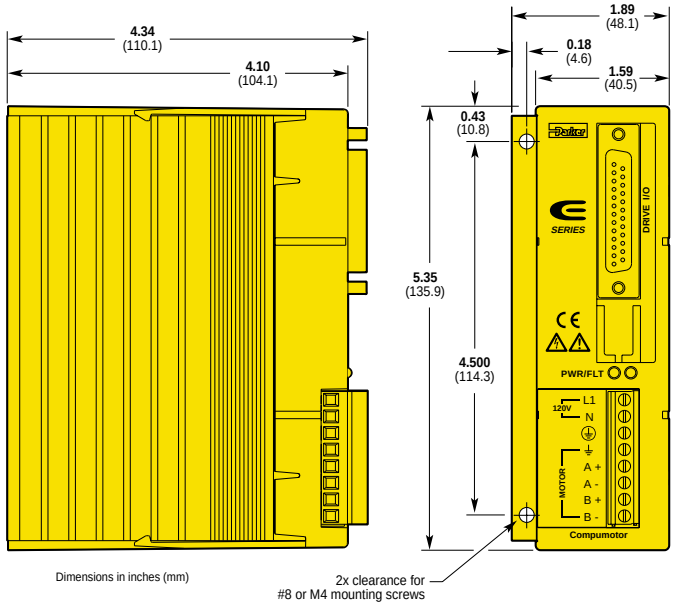
See Servo Drive section for the full line of Gemini servo drives and drive/controllers.

E Series Connections

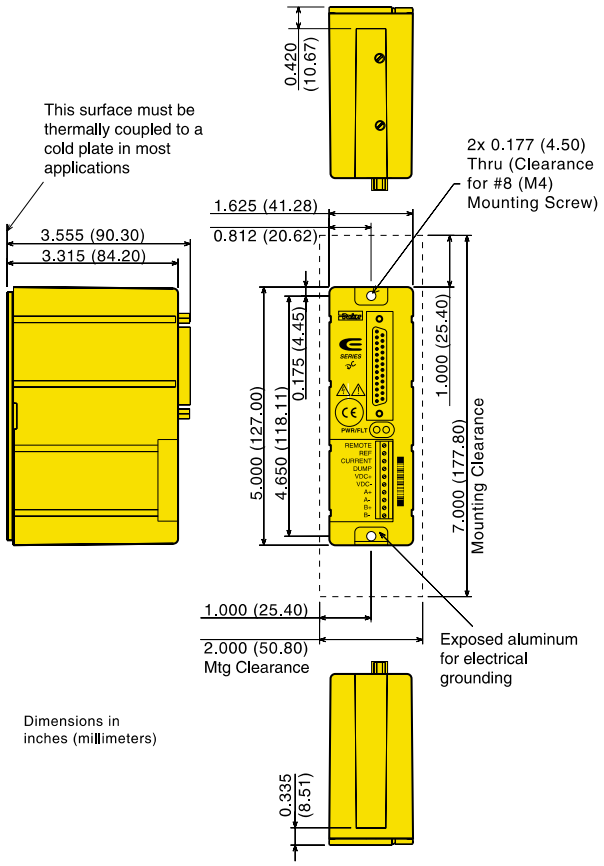


E Series Screw-Terminal	
Pin No	**Signal**
1 (Top)	LINE
2	NEUTRAL
3	GND
4	MOTOR GND
5	A+
6	A-
7	B+
8 (Bottom)	B-

E-AC Dimensions



E-DC Drive Dimensions



OS Series
Motor Specifications
Size 23 Frame

Parameters		E-DC OS2HA	E-DC OS21A	E-DC OS22A	E-AC OS2HB	E-AC OS21B	E-AC OS22B
Static torque	oz-in (Nm)	49.1 (0.35)	114 (0.81)	186 (1.31)	61.35 (0.43)	126.5 (0.84)	238 (1.68)
Rotor inertia	oz-in^2 (kg-cm^2)	0.39 (0.07)	0.66 (0.12)	1.39 (0.25)	0.39 (0.07)	0.66 (0.12)	1.39 (0.25)
Drive Current Apk (Arms)	Series Parallel	3.0 (2.12) NA	4.8 (3.39) NA	4.8 (3.39) NA	1.76 (1.24) 3.25 (2.30)	1.88 (1.33) 3.5 (2.47)	2.38 (1.68) 3.5 (2.47)
Phase Inductance (mH)	Series Parallel	1.7 NA	1.8 NA	2.8 NA	8.6 2.2	12 3	16.6 4.2
Detent Torque	oz-in (N-m)	2.5 (0.02)	4.0 (0.03)	7.0 (0.05)	2.5 (0.02)	4.0 (0.03)	7.0 (0.05)
Bearings Information							
Thrust Load	lb (kg)	13 (5.9)	13 (5.9)	13 (5.9)	13 (5.9)	13 (5.9)	13 (5.9)
Radial Load	lb (kg)	20 (9.1)	20 (9.1)	20 (9.1)	20 (9.1)	20 (9.1)	20 (9.1)
End Play (Reversing load equal to 1 lb)	in (mm)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)
Radial Play (Per 0.5 lb load)	in (mm)	0.0008 (0.02)	0.0008 (0.02)	0.0008 (0.02)	0.0008 (0.02)	0.0008 (0.02)	0.0008 (0.02)
Motor Weight	lb (kg)	1 (0.5)	1.5 (0.7)	2.5 (1.1)	1 (0.5)	1.5 (0.7)	2.5 (1.1)
Certifications	UL recognized CE (LVD) CE (EMC & LVD)	Pending Yes No	Pending Yes No	Pending Yes No	Pending Yes No	Pending Yes No	Pending Yes No

See Servo Drive section for the full line of Gemini servo drives and drive/controllers.

VS Series Motor Specifications Size 17, 23 and 34 Frame

Parameters		Size 17 Frame		Size 23 Frame			Size 34 Frame	
		VS12B	VS13B	VS21B	VS22B	VS23B	VS31B	VS32B
Static torque - E-AC	oz-in (Nm)	55.27 (0.39)	72.8 (0.51)	115.5 (0.82)	194.5 (1.37)	334.5 (2.36)	551.8 (3.90)	1269.67 (8.97)
Static torque - E-DC	oz-in (Nm)	58 (0.41)	81 (0.57)	115 (0.81)	156 (1.10)	330 (2.33)	442 (3.12)	664 (4.69)
Rotor inertia	oz-in^2 (kg-cm^2)	0.3 (0.054)	0.37 (0.068)	0.66 (0.12)	1.64 (0.3)	2.62 (0.48)	7.65 (1.4)	14.8 (2.7)
Drive Current Apk (Arms) - E-AC	Series Parallel	1.0 (0.71) 2.0 (1.42)	1.01(0.71) 2.02 (1.43)	2.26 (1.6) 3.5 (2.47)	2.01 (1.42) 3.5 (2.47)	2.01 (1.42) 3.5 (2.47)	3.0 (2.12) 3.5 (2.47)	3.13 (2.21) 3.5 (2.47)
Drive Current Apk (Arms) - E-DC	Series Parallel	NA 3.0 (2.12)	NA 3.0 (2.12)	NA 4.8 (3.39)	NA 4.0 (2.83)	NA 4.8 (3.39)	NA 4.8 (3.39)	NA 4.8 (3.39)
Phase Inductance (mH)	Series Parallel	12.8 (3.2)	11.2 (2.8)	5 (1.25)	12 (3.0)	15.4 (3.85)	15.8 (3.95)	25.0 (6.25)
Detent Torque	oz-in (N-m)	2.5 (0.02)	4.0 (0.03)	7.0 (0.05)	8.8 (0.06)	18.0 (0.13)	27.0 (0.19)	50 (0.35)
Bearings Information								
Thrust Load	lb (kg)	11.0 (5)	11.0 (5)	17.6 (8)	17.6 (8)	17.6 (8)	35.3 (16)	35.3 (16)
Radial Load	lb (kg)	7.7 (3.5)	7.7 (3.5)	15.0 (6.8)	15.0 (6.8)	15.0 (6.8)	30.9 (14)	30.9 (14)
End Play (with 2.2 lbs axial load)	in (mm)	0.003 (0.075)	0.003 (0.075)	0.003 (0.075)	0.003 (0.075)	0.003 (0.075)	0.0032 (0.080)	0.0032 (0.080)
Radial Play (with 1.1 lb radial load)	in (mm)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.001 (0.025)	0.0008 (0.020)	0.0008 (0.020)
Motor Weight	lb (kg)	0.55 (0.25)	0.77 (0.35)	1.03 (0.47)	1.54 (0.7)	2.2 (1.0)	3.86 (1.75)	6.18 (2.8)
Certifications	UL recognized	No	No	No	No	No	No	No

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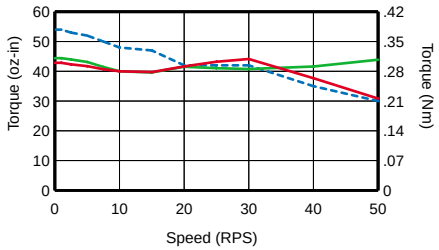
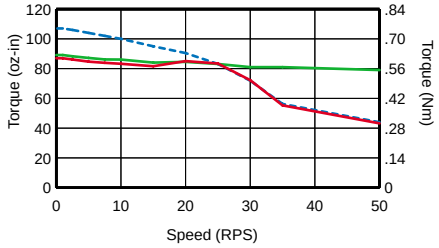
Motor Speed-Torque Performance Curves

E-AC with OS and VS Series motors, 17, 23 and 34 frame

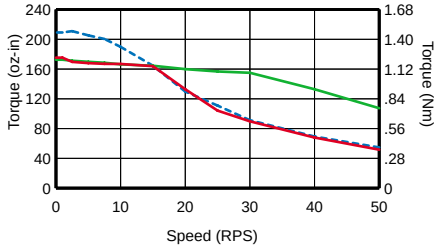
OS2HB/E-AC



OS21B/E-AC

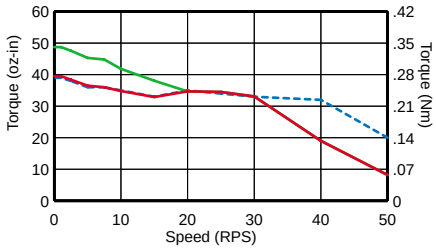


OS22B/E-AC

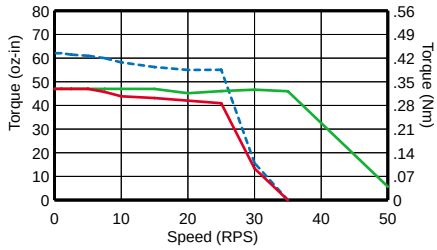


SERIES PARALLEL FULL

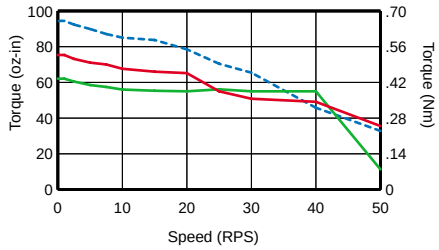
VS12B/E-AC



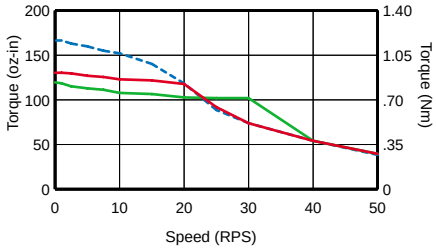
VS13B/E-AC



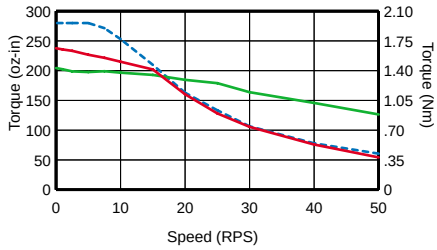
VS21B/E-AC



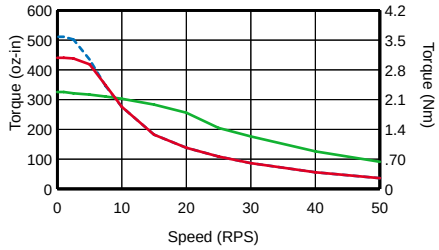
VS22B/E-AC



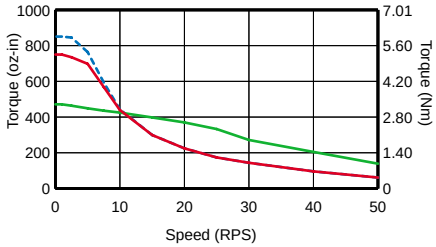
VS23B/E-AC



VS31B/E-AC



VS32B/E-AC



SERIES PARALLEL FULL

See Servo Drive section for the full line of Gemini servo drives and drive/controllers.

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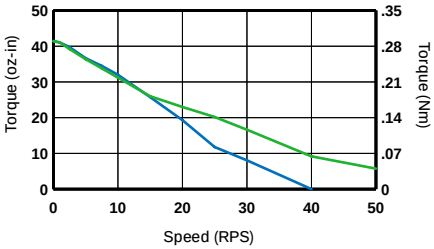
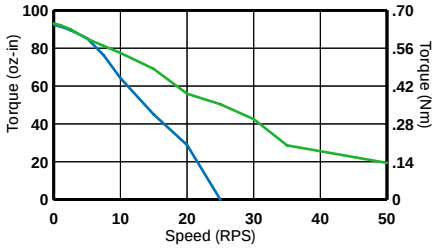
Motor Speed-Torque Performance Curves

E-DC Drive with OS and VS Series motors, 17, 23 and 34 frame

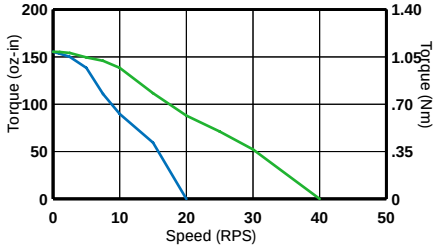
OS2HA/E-DC



OS21A/E-DC

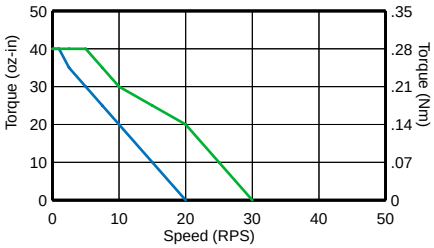


OS22A/E-DC

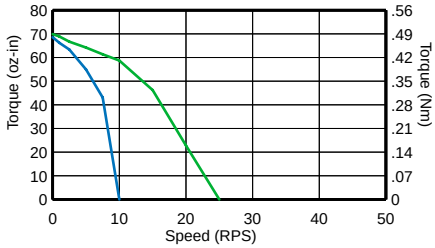


24V 48V

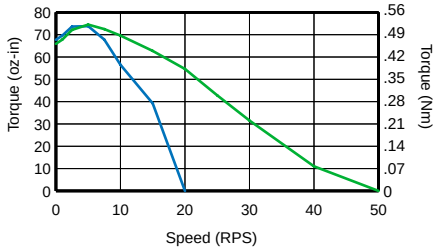
VS12B/E-DC



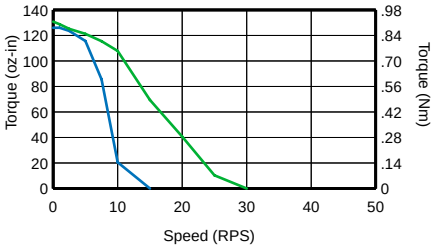
VS13B/E-DC



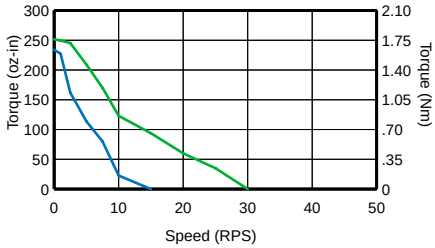
VS21B/E-DC



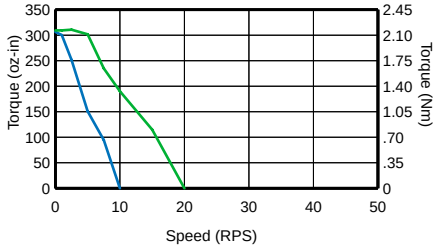
VS22B/E-DC



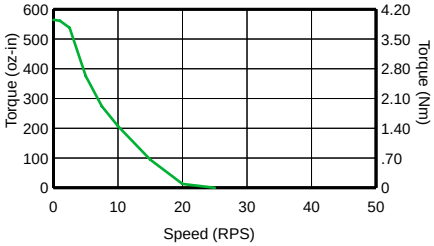
VS23B/E-DC



VS31B/E-DC



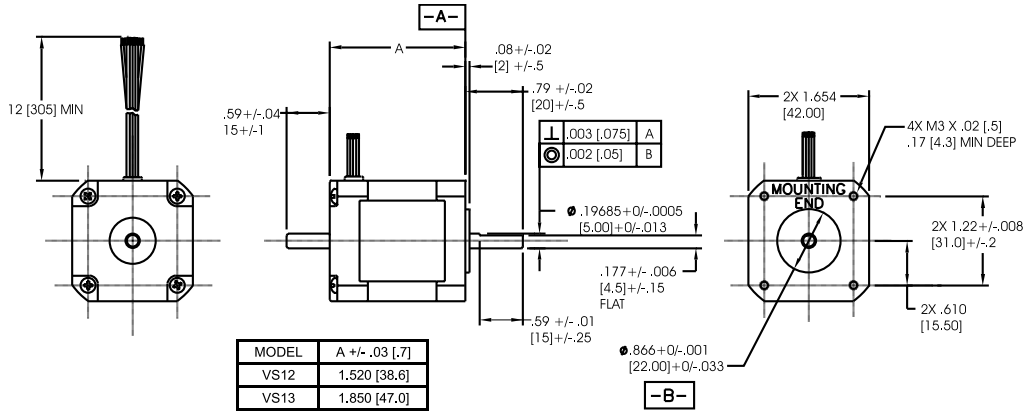
VS32B/E-DC



24V 48V

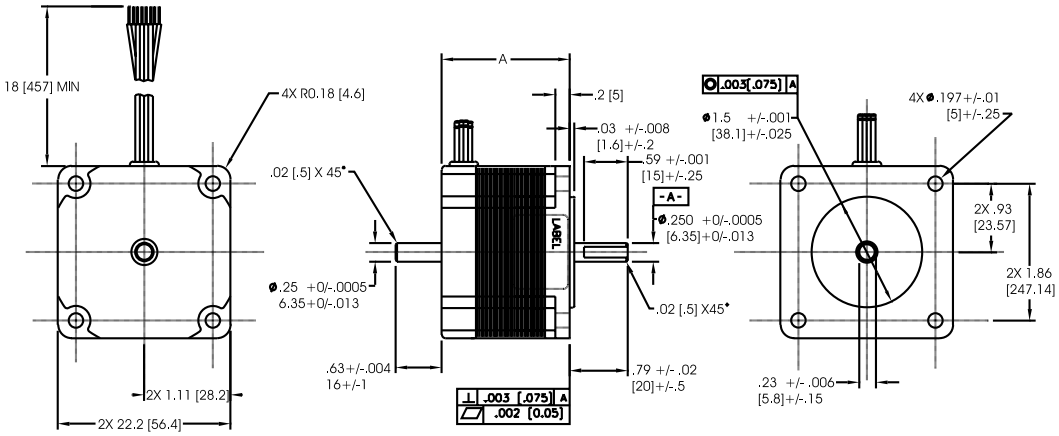
Dimensional Drawings

VS Series Motors, Size 17 Frame



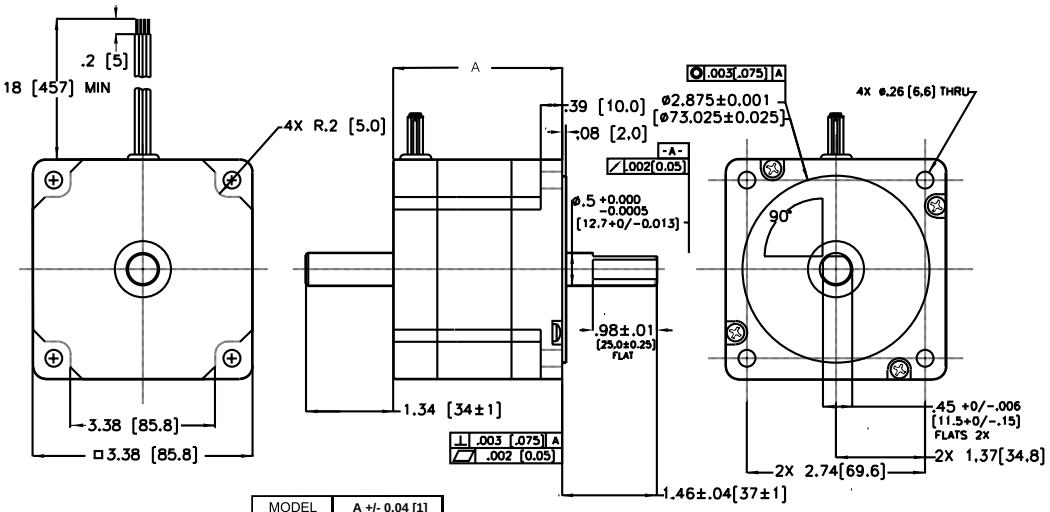
MODEL	A +/- .03 [.7]
VS12	1.520 [38.6]
VS13	1.850 [47.0]

Size 23 Frame



MODEL	A +/- .03 [.7]
VS21	1.732 [44.0]
VS22	2.165 [55.0]
VS23	3.051 [77.5]

Size 34 Frame



MODEL	A +/- 0.04 [1]
VS31	2.598 [66.0]
VS32	3.780 [96.0]

See Servo Drive section for the full line of Gemini servo drives and drive/controllers.