GLENTEK GAMMA SERIES DIGITAL PWM SERVO DRIVES
MODELS: SMB9G16 & SMC9G16

Revision: 8-26-25

Glentek's Gamma Series Digital PWM Servo Drives represent Glentek's latest offering of higher performance multi-core DSP control of brushless (standard servo and high-speed spindle), brush type, rotary, linear, voice coil and AC induction motors. The Gamma series offers expanded command and control modes including CANopen and indexing/point-to-point. The drives also accept feedback from a wider range of devices and protocols, namely absolute serial encoders (BiSS, EnDat and T-Format) and analog Sin/Cos encoders. Additional programmable I/O includes 5 optically isolated inputs, 6 Schmitt triggers, 2 differential inputs, 3 MOSFET outputs, two optically isolated outputs, and a general purpose relay. Stand alone units are AC powered. These drives incorporate Field Oriented Control (FOC) and Space Vector Modulation (SVM) algorithms which provide optimum control that enable motors to run cooler and at higher velocities. Set-up, tuning and system diagnostics is accomplished using MotionMaestro (Glentek's Windows-based software).

ELECTRICAL RATINGS

Input Voltage			Output Current [1]			Available Package Configurations			UL [4]	Heatsink Type (Derating Factor) [2]	
VDC	VAC	Model Code [3]	Cont. A (A_{RMS})	Peak A (A_{RMS})	Model Code [3]	Module	Stand Alone	Multi-Axis		Module	Stand Alone
24-60	N/A	0	5 (3.5)	10 (7.1)	1	•			•	L-Bracket (1)	N/A
24-60	N/A	0	10 (7.1)	20 (14.1)	3	•			•	L-Bracket (1)	N/A
24-60	N/A	0	15 (10.6)	30 (21.2)	4	•			•	L-Bracket (1)	N/A
24-60	N/A	0	20 (14.1)	40 (28.3)	5	•			•	Short Fin (1)	N/A
24-60	N/A	0	25 (17.7)	50 (35.4)	6	•			•	Short Fin (1)	N/A
24-60	N/A	0	30 (21.2)	60 (42.4)	7	•			•	Short Fin (1)	N/A
24-60	N/A	0	45 (31.8)	80 (56.6)	8	•			•	Short Fin (2)	N/A
60-190	110-130	1	5 (3.5)	10 (7.1)	1	•	•	•	•	L-Bracket (1)	LB (1)/ SF (1)
60-190	110-130	1	10 (7.1)	20 (14.1)	3	•	•	•	•	L-Bracket (1)	LB (1)/ SF (1)
60-190	110-130	1	15 (10.6)	30 (21.2)	4	•	•	•	•	L-Bracket (2)	LB (2)/ SF (1)
60-190	110-130	1	20 (14.1)	40 (28.3)	5	•	•	•	•	Short Fin (1)	Short Fin (1)
60-190	110-130	1	25 (17.7)	50 (35.4)	6	•	•	•	•	Short Fin (2)	Short Fin (2)
60-190	110-130	1	30 (21.2)	60 (42.4)	7	•	•	•	•	Long Fin (1)	Long Fin (1)
60-190	110-130	1	45 (31.8)	80 (56.6)	8	•	•	•	•	Long Fin (2)	Long Fin (2)
190-370	208-240	2	5 (3.5)	10 (7.1)	1	•	•	•	•	L-Bracket (1)	LB (1)/ SF (1)
190-370	208-240	2	10 (7.1)	20 (14.1)	3	•	•	•	•	L-Bracket (2)	LB (2)/ SF (1)
190-370	208-240	2	15 (10.6)	30 (21.2)	4	•	•	•	•	L-Bracket (3)	LB (3)/ SF (2)
190-370	208-240	2	20 (14.1)	40 (28.3)	5	•	•	•	•	Short Fin (2)	Short Fin (2)
190-370	208-240	2	25 (17.7)	50 (35.4)	6	•	•	•	•	Short Fin (3)	Short Fin (3)
190-370	208-240	2	30 (21.2)	60 (42.4)	7	•	•	•	•	Long Fin (2)	Long Fin (2)
190-370	208-240	2	45 (31.8)	80 (56.6)	8	•	•	•	•	Long Fin (3)	Long Fin (3)
370-565	360-400	3	5 (3.5)	10 (7.1)	1	•	•	•	•	L-Bracket (2)	LB (2)/ SF(1)
370-565	360-400	3	10 (7.1)	20 (14.1)	3	•	•	•	•	Short Fin (2)	Short Fin (2)
370-565	360-400	3	15 (10.6)	30 (21.2)	4	•	•	•	•	Short Fin (3)	Short Fin (3)
370-565	360-400	3	20 (14.1)	40 (28.3)	5	•	•	•		Long Fin (2)	Long Fin (2)
370-565	360-400	3	25 (17.7)	50 (35.4)	6	•	•	•		Long Fin (3)	Long Fin (3)
370-565	360-400	3	30 (21.2)	60 (42.4)	7	•	•	•		Long Fin (4)	Long Fin (4)
565-710	460-500	4	5 (3.5)	10 (7.1)	1	•	•	•	•	L-Bracket (3)	LB (3)/ SF (2)
565-710	460-500	4	10 (7.1)	20 (14.1)	3	•	•	•	•	Short Fin (3)	Short Fin (3)
565-710	460-500	4	15 (10.6)	30 (21.2)	4	•	•	•	•	Long Fin (3)	Long Fin (3)
565-710	460-500	4	20 (14.1)	40 (28.3)	5	•	•	•		Long Fin (4)	Long Fin (4)

Notes:

[1] The column Cont. Output Current is the continuous current and the column Peak Output Current is the intermittent peak current. For output current ratings in brushless mode, ratings for each model are listed as peak of the sine wave phase current values followed by the equivalent RMS phase current values (in parentheses). In brush or voicecoil mode, A is the current, and the RMS values (in parentheses) can be ignored. All output current ratings are for three-phase VAC inputs or VDC inputs. If a single-phase VAC input is used, the total output current for all axes is limited to a maximum of 15 A cont. / 30 A peak.

[2] Three heatsink types L-Bracket (LB), Short Fin (SF), and Long Fin (LF) are available depending on the input voltage and output current. Some Stand Alone units are available with L-bracket or Short Fin heatsinks (LB / SF). For dimensions, refer to pgs. 5-9. There are 4 standard categories for ambient operating temperature and current derating denoted by the number following the heatsink type. All categories require forced air cooling.

- **Category 1: 0 to 60 °C without derating. Derate current 10% per °C over 60 °C.**
- **Category 2: 0 to 50 °C without derating. Derate current 5% per °C over 50 °C.**
- **Category 3: 0 to 40 °C without derating. Derate current 3% per °C over 40 °C.**
- **Category 4: 0 to 30 °C without derating. Derate current 2.5% per °C over 30 °C.**
- **Special: Contact Glentek for models with a lower operating temperature limit of -40 °C.**

[3] Model Codes are used on pgs. 10-12 for model numbering

[4] UL Recognized Components are available as an option for the selected drives.

[5] Bus power logic (SMB models) not available for input voltages of greater than 370 VDC (Module) or 360 VAC (Stand Alone and Multi-Axis).

FEATURES

Command/Control Modes
+/-10 VDC for current (torque) or velocity (RPM)
Pulse (step) and direction
Encoder follower
CW/CCW (up/down mode)
External sine commutation (2-phase current mode)
RS-232 & RS-485
PWM for current (torque) or velocity (RPM) in 50% duty cycle format (one-wire) or 100% duty cycle format (two-wire)
Indexer/Point-to-Point
Camming/Gearing
CANopen

Feedback
Incremental (TTL) quadrature encoder
Digital Hall sensors or commutation tracks from encoder
Absolute serial encoder (BiSS, EnDat, and T-Format)
Analog Sin/Cos encoder
Resolver
Analog tachometer
Two feedback devices: Any of the devices above and an additional incremental (TTL) quadrature encoder

I/O		
Dedicated Digital I/O	Inputs:	2 STO optically isolated
	Output:	Brake (max 2 A @ 24 VDC)
Programmable Digital I/O	Inputs:	5 optically isolated, 6 Schmitt trigger, 2 differential
	Outputs:	3 MOSFETS (max 1.5A, 24 VDC), 2 optically isolated (max 10 mA, 24 VDC), relay (max 2 A, 30 VDC)
Analog I/O	Inputs:	2 differential (16 bit A/D)
	Outputs:	2 single ended, programmable (12 bit A/D)

Safety Disable
Safe Torque Off (STO) in accordance with IEC61800-5-2 (available upon request only)

Environmental Conditions	
Storage Temperature:	-40°C to 80°C
Ambient Operating Temperature:	Refer to the electrical ratings table
Humidity:	5% to 95% relative humidity, non-condensing
Altitude:	Up to 1000m without derating, derate current 10% per 1000m above 1000m

FEATURES

Performance	
FOC	All Gamma Series employ Field Oriented Control method which allows accurate control in both steady state or transient operation, and optimal orientation of the magnetic field.
Space Vector Modulation	Glentek's advanced algorithms allow for maximum utilization of the DC bus voltage while generating minimum harmonic distortion of the currents in the winding of 3-phase AC motor.
Digital current loops	Current loop bandwidths up to 5 kHz.
Digitally tuned	All parameters set digitally. No potentiometers to adjust. DSP control for the ultimate in high performance.
Parametric filtering	Provides control engineers advanced filtering to eliminate unwanted system mechanical resonance.
Smart-Comm Initialization	Eliminates the need for Hall sensor or commutation tracks for many applications.
Auto Phase Finding	Plug and Play for all types of three phase brushless motors. The drives algorithm will automatically find and align the motor phases.
Auto Phase Advance	Glentek's advanced algorithms incorporated in the Gamma Series drives, automatically provide phase advance, insuring that the current is delivered at the appropriate time, and provides the most efficient operation.
Sinusoidal commutation	For the ultimate in efficiency and smooth motion. Commutates from almost any resolution linear or rotary encoder or Hall sensors only.
Fault protection	Short from output to output, short from output to ground, drive RMS over current, drive under/over voltage, drive over temperature, motor over temperature.
On-the-fly mode switching	This feature allows the drive to switch between any mode of operation on-the-fly.
Software configurable	Glentek's Windows™ based MotionMaestro© software provides ease of set-up, monitoring and tuning with no previous programming experience required. This software is Windows™ 95/98/2000/XP, NT, Vista, 7, 8, and10 compatible.
Silent operation	25 kHz PWM standard.
Command/control Modes	+/-10V for current (torque) or velocity (RPM), pulse (step) and direction, encoder follower, external sine commutation (2-phase current mode), RS-232, RS-485, PWM for current (torque) or velocity (RPM), camming/gearing, Indexer/Point-to-Point and CANopen.
Regulatory	
UL Recognized	Servo drives that are UL Recognized Components for the US and Canada are available.
CE marked	All servo drives are CE marked.
RoHS compliant	All servo drives are RoHS compliant.
Connectivity	
CANopen	High-speed (up to 1 Mbits/s) CAN interface for communications between nodes in real-time control applications. The drive device profile is based on IEC 61800-7-301/201 (CiA 402).
RS-232 or RS-485	High speed (115.2K baud) serial communication interface for setup and tuning and diagnostics. Note: RS-485 is optional.
Feedback	
Encoder feedback	Accepts quadrature feedback up to 40 MHz (10 MHz per channel). By special request only, quadrature feedback up to 100 MHz (25 MHz per channel) may be possible. Absolute serial encoder (BiSS, EnDat, and T-Format). Analog Sin/Cos encoder.
Encoder Output Divider	The encoder input signal can be divided by a user selectable integer for the encoder output signal. Note: Available upon request only.
Resolver Feedback	The drive creates a simulated encoder output with a typical resolution of 12 bits.
Tachometer feedback	Accepts analog signals from all types of tachometer feedback.
Two feedback devices	We can accept any of the feedback devices listed above plus an additional incremental encoder.
I/O	
Programmable Functions	Analog signal command, +/- limits, inhibit/enable, fault, reset, motor temperature, encoder and step & direction.
Input	
Wide operating voltage	24-710 VDC for drive modules. All stand alone and multi axis versions can be ordered for operation from either 110-130 VAC, 208-240 VAC, 360-400 VAC, and 460-500 VAC main lines (single or 3-phase, 50/60 Hz). Note: Non-standard voltages can be ordered upon request.
Direct AC operation	The stand-alone units and multi-axis chassis include DC bus power supplies, cooling fans and a regen clamp with dissipation resistor.
External logic supply	24-48VDC, 600mA max @ 24VDC powers all logic & encoder. This works as a "keep alive" for drives.
Build	
Complete isolation	Complete isolation between signal and power stage.
Non-volatile memory	All parameters are stored in non-volatile memory for reliable start up. Note: Available upon request, up to 16 different configurations can be stored in the drives's non-volatile memory.
Relay outputs	Two pins provide an interface for the relay. They turn on when a desired condition occurs.
Status indicator	7-segment display indicates drive status and diagnostics.
SMT construction	Provides ultra compact size, cost competitive package and high reliability.

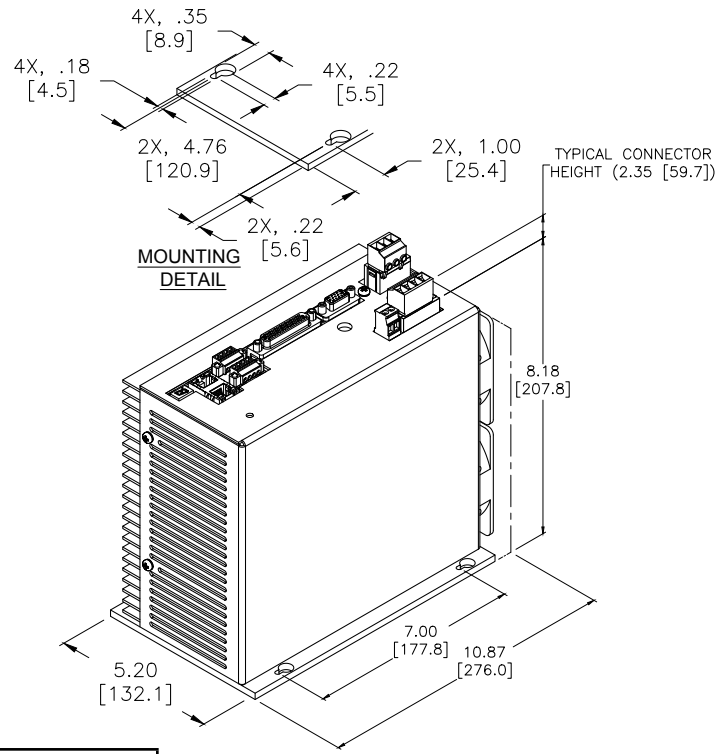
Package Configuration Selection Table

Glentek offers three different types of packages: stand alone, module, and multi-axis. Stand alone and multi-axis packages require an AC input and are available in three configurations: A, B, and F. These codes are used in the model numbering. Modules are typically used for cost sensitive applications where the customer provides DC bus power supply, forced-air cooling, and regen clamp. The table below specifies the differences between the various package configurations. Custom configurations are available upon request.

Feature	Stand Alone: A	Stand Alone: B	Stand Alone: F	Module	Multi-Axis: A	Multi-Axis: B
Drive(s)	1	1	1	1	1-5	1-5
DC Bus Power Supply	•	•	•		•	•
In-rush current limiting at power on	•	•	•		•	•
Regen Clamp	•		•		•	
Dissipation Resistor	•				•	
Fan(s)	•	•			•	•
Fuses					•	•

SMB/SMC9G16-1A/1B Stand Alone (Short Fin)

Dimensions are inches [millimeter]

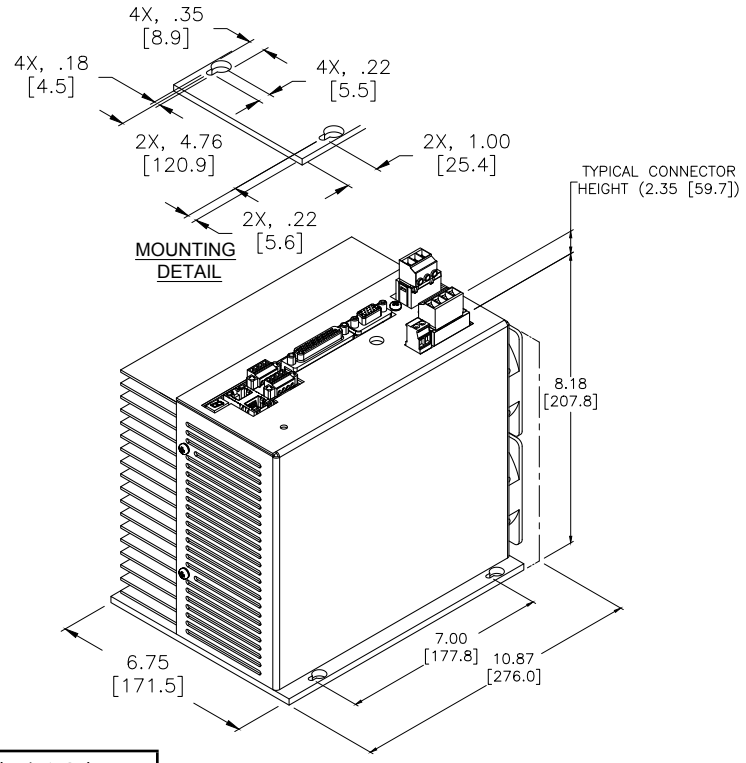


Weight	9.0 lb / 4.1 kg

DIMENSIONS

SMB/SMC9G16-1A/1B Stand Alone (Long Fin)

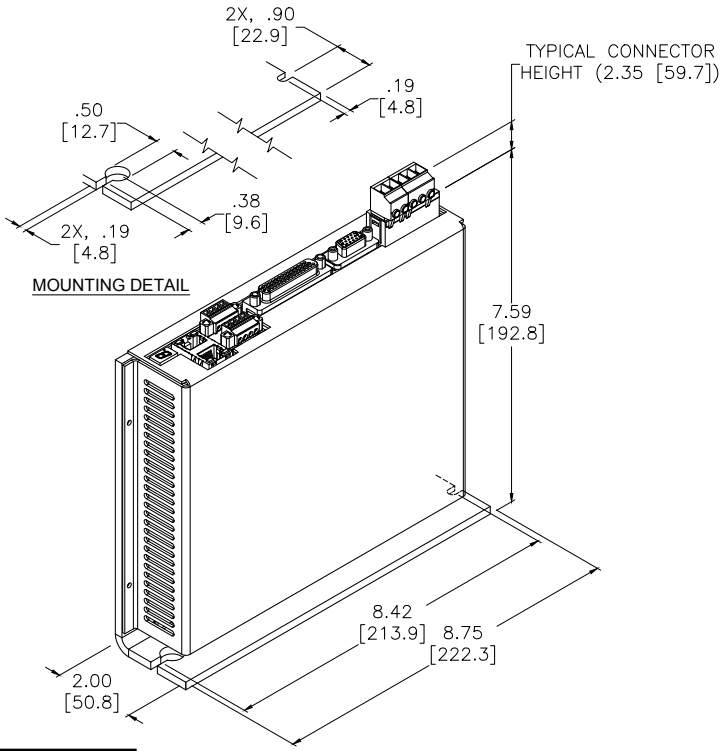
Dimensions are inches [millimeter]



Weight	9.5 lb / 4.3 kg

SMB/SMC9G16 Module (L-Bracket)

Dimensions are inches [millimeter]

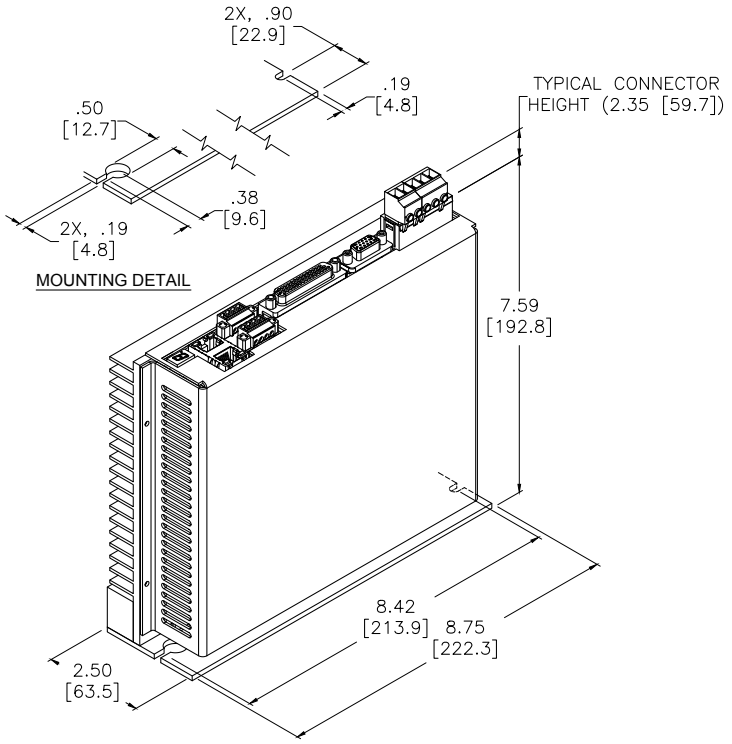


Weight	2.6 lb / 1.2 kg

DIMENSIONS

SMB/SMC9G16 Module (Short Fin)

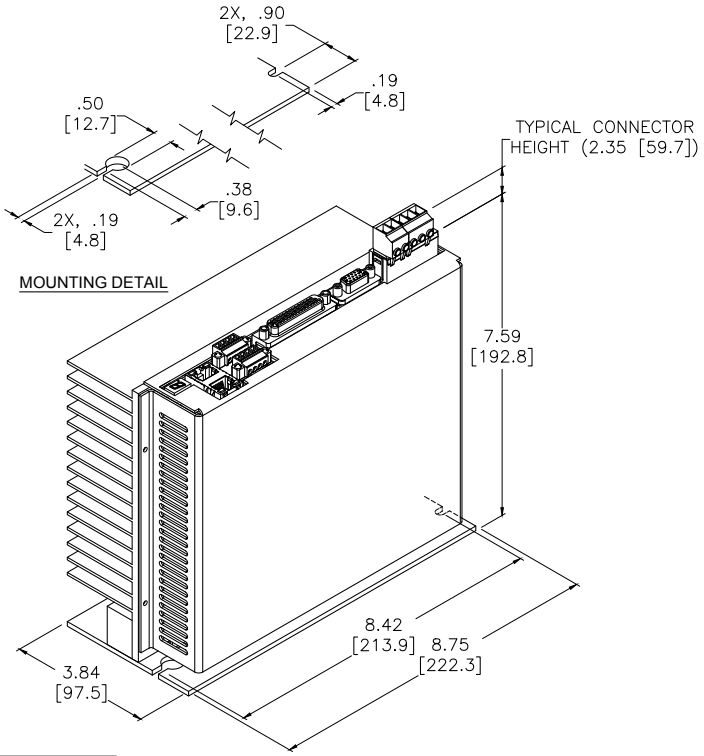
Dimensions are inches [millimeter]



Weight	4.0 lb / 1.8 kg

SMB/SMC9G16 Module (Long Fin)

Dimensions are inches [millimeter]

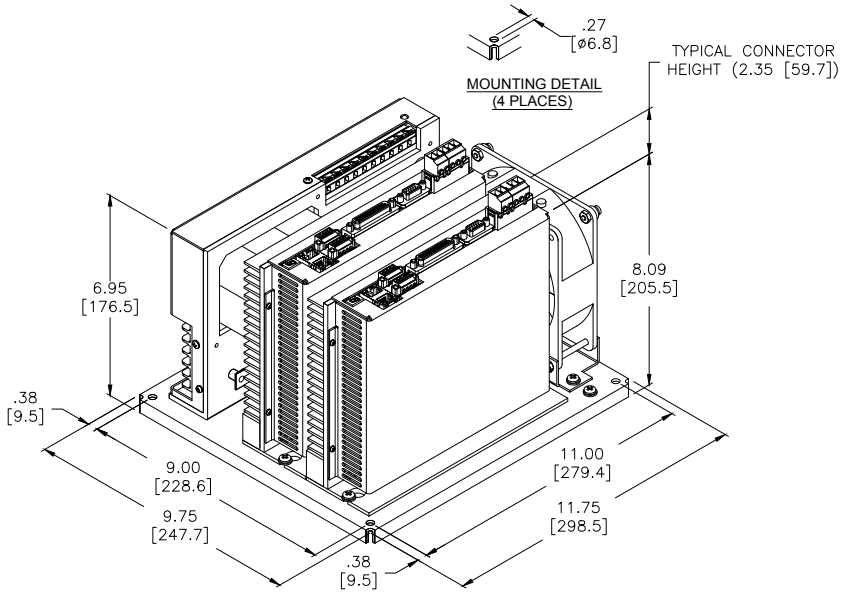


Weight	4.5 lb / 2.0 kg

DIMENSIONS

SMB/SMC9G16 2-Axis Package

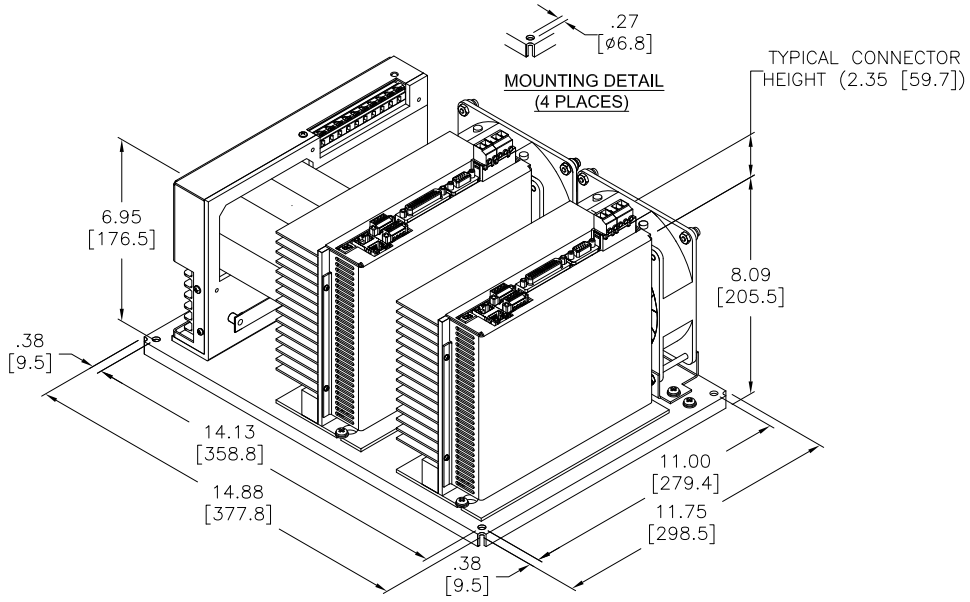
Dimensions are inches [millimeter]



Heatsink Type	Weight
L-Bracket	13.0 lb / 5.9 kg
Short Fin	16.0 lb / 7.3 kg

SMB/SMC9G16 2-Axis Package

Dimensions are inches [millimeter]

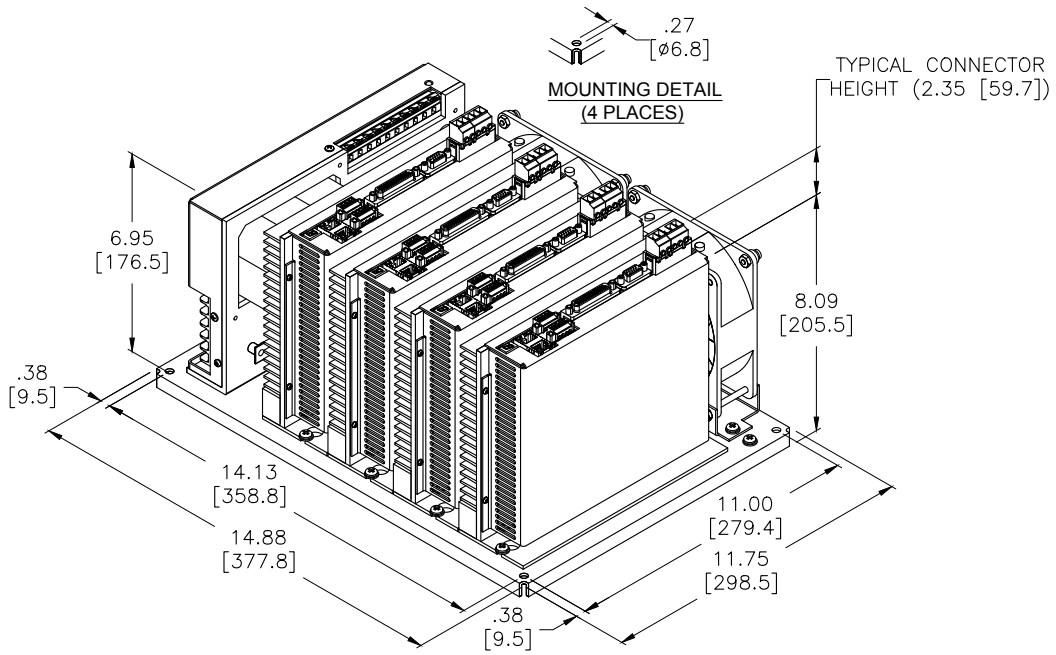


Heatsink Type	Weight
Long Fin	18.5lb / 8.4 kg

DIMENSIONS

SMB/SMC9G16 4-Axis Package

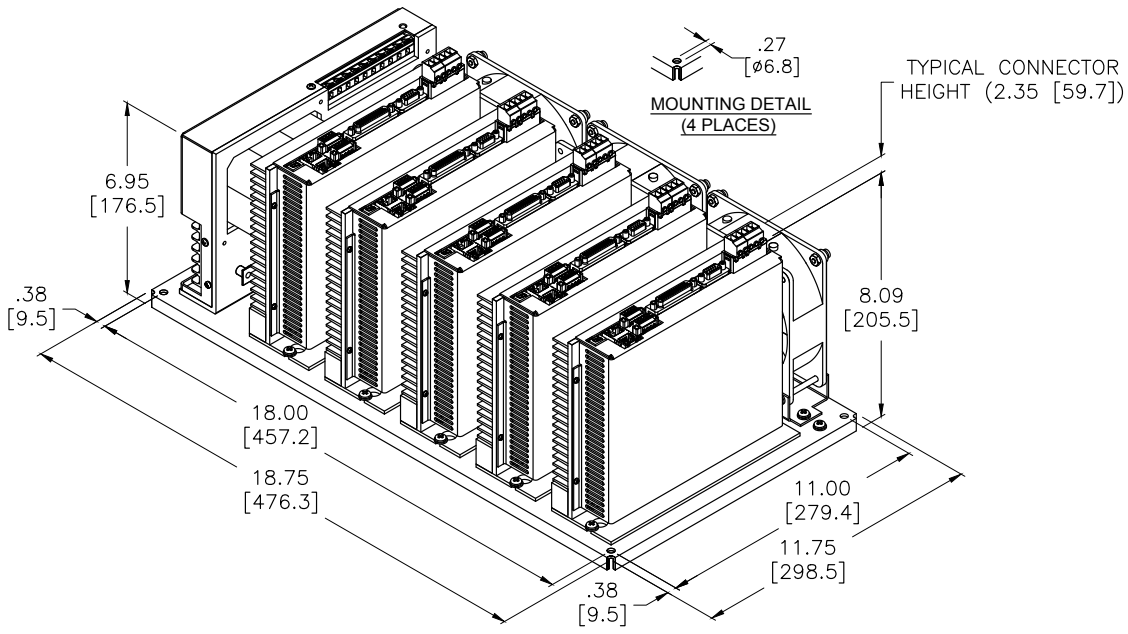
Dimensions are inches [millimeter]



Heatsink Type	Weight
L-Bracket	20.0 lb / 9.1 kg
Short Fin	24.0 lb / 10.9 kg

SMB/SMC9G16 5-Axis Package

Dimensions are inches [millimeter]



Heatsink Type	Weight
L-Bracket	23.0 lb / 10.4 kg
Short Fin	30.0 lb / 13.6 kg

STAND ALONE MODEL NUMBERING

This section explains the model numbering system for Glentek's Gamma Series Digital PWM Brushless Servo Drives. The model numbering system is designed so that you, our customer, will be able to quickly and accurately create the model number for the drive that best suits your requirements. **Please choose the model and package configuration you require from the "Electrical Ratings" table on pg. 2.** Then complete the drive configuration code you require using the information on this page. After completing your model number, please contact a Glentek Sales Engineer to confirm that the model number you have created is correct.

Notes: ① ② ③ ④ ⑤ ⑥ see pg. 11 for more details.

SM [ ] 9G16 - [ ][ ] - [ ][ ][ ] - [ ][ ][ ][ ][ ] - 1 [ ] - 1 - [ ]

On-Board or External Bus Logic ①	
B	Bus Power Logic
C	24 VDC External Logic Power, Keep Alive

Input Voltage ②			
1	110-130 VAC	**3**	360-400 VAC
2	208-240 VAC	**4**	460-500 VAC

Continuous Output Current ②							
1	5 A	**4**	15 A	**6**	25 A	**8**	45 A
3	10 A	**5**	20 A	**7**	30 A	**-**	-

Operation Modes (Insert a 0 if the option is not included, or a 1 if it is included)
Brushless Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
Brush or Voice Coil Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
External Sine Commutation / 2 Phase Current Mode ③

Feedback Options	
A	No feedback devices
B	Incremental (TTL) Quadrature Encoder and/or Hall Sensor/Comm. Track
C	Analog Sin/Cos Encoder and/or Hall Sensor/Commutation Track
D	Resolver
E	Absolute Encoder without Analog Sin/Cos Channels
F	Tachometer ③
G	Absolute Encoder with Analog Sin/Cos Channels
Z	Special

Communication (Connector) Options ④			
A	RS-232 (RJ45) (Standard)	**D**	RS-485 (RJ45) and RS-232 (4 pin Molex)
C	CANopen (RJ45) and RS-232 (4 pin Molex)	**-**	-

Special Features (Available at additional cost) (Insert a 0 if the option is not included, or a 1 if it is included)
Safe Torque Off (STO) ⑤
Encoder Divider / Simulated Encoder Output
UL Recognized Component

Stand Alone Package Configuration	
A	Built In Regen Clamp with dissipation resistor and fan(s) (Standard for drives with a cont. current ≥20 amps)
B	No Built In Regen Clamp
C	Custom (Contact Glentek)
F	Built in Regen Clamp without dissipation resistor nor fan ⑥

Fan Voltage					
0	No Fan	**1**	115 VAC	2	230 VAC

MODULE MODEL NUMBERING

SM [ ] 9G16 - [ ][ ] - [ ][ ][ ] - [ ][ ][ ][ ][ ] - 1

On-Board or External Bus Logic ①	
B	Bus Power Logic
C	24 VDC External Logic Power, Keep Alive

Input Voltage ②					
0	24-60 VDC	**2**	190-370 VDC	**4**	565-710 VDC
1	60-190 VDC	**3**	370-565 VDC	**-**	-

Continuous Output Current ②					
1	5 A	**5**	20 A	**8**	45 A
3	10 A	**6**	25 A	**-**	-
4	15 A	**7**	30 A	**-**	-

Operation Modes (Insert a 0 if the option is not included, or a 1 if it is included)
Brushless Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
Brush or Voice Coil Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
External Sine Commutation / 2 Phase Current Mode ③

Feedback Options	
A	No feedback devices
B	Incremental (TTL) Quadrature Encoder and/or Hall Sensor/Comm. Track
C	Analog Sin/Cos Encoder and/or Hall Sensor/Commutation Track
D	Resolver
E	Absolute Encoder without Analog Sin/Cos Channels
F	Tachometer ③
G	Absolute Encoder with Analog Sin/Cos Channels
Z	Special

Communication (Connector) Options ④			
A	RS-232 (RJ45) (Standard)	**D**	RS-485 (RJ45) and RS-232 (4 pin Molex)
C	CANopen (RJ45) and RS-232 (4 pin Molex)	**-**	-

Special Features (Available at additional cost) (Insert a 0 if the option is not included, or a 1 if it is included)
Safe Torque Off (STO) ⑤
Encoder Divider / Simulated Encoder Output
UL Recognized Component

Notes (For 9G16 and 9GE Stand Alone, Module, and Multi-Axis models):
① Bus power logic (SMB models) not available for input voltages of greater than 370 VDC (Module) or 360 VAC (Stand Alone and Multi-Axis).
② Refer to the Electrical Ratings on pg. 2 for available combinations of voltage and current.
③ External sine commutation and tachometer may not both be selected.
④ RS-232 is typically used for communicating with Glentek's MotionMaestro software for initial drive setup, configuration, and monitoring.
⑤ Safe Torque Off (STO) option might require longer lead times, depending on the model.
⑥ External forced air cooling must be supplied for rated current.

MULTI-AXIS MODEL NUMBERING

Notes: ① ② ③ ④ ⑤ ⑥ **see** **pg. 11** **for more details.**

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On-Board or External Bus Logic ①	
B	Bus Power Logic
C	24 VDC External Logic Power, Keep Alive

Input Voltage ②			
-	-	**3**	360-400 VAC
1	110-130 VAC	**4**	460-500 VAC
2	208-240 VAC	**-**	-

Continuous Output Current ②					
1	5 A	**5**	20 A	**8**	45 A
3	10 A	**6**	25 A	**-**	-
4	15 A	**7**	30 A	**-**	-

Operation Modes (Insert a 0 if the option is not included, or a 1 if it is included)
Brushless Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
Brush or Voice Coil Mode - Analog & PWM Input, Current, Velocity, or Position Mode (Pulse Follower)
External Sine Commutation / 2 Phase Current Mode ③

Feedback Options	
A	No feedback devices
B	Incremental (TTL) Quadrature Encoder and/or Hall Sensor/Comm. Track
C	Analog Sin/Cos Encoder and/or Hall Sensor/Commutation Track
D	Resolver
E	Absolute Encoder without Analog Sin/Cos Channels
F	Tachometer ③
G	Absolute Encoder with Analog Sin/Cos Channels
Z	Special

Communication (Connector) Options ④			
A	RS-232 (RJ45) (Standard)	**D**	RS-485 (RJ45) and RS-232 (4 pin Molex)
C	CANopen (RJ45) and RS-232 (4 pin Molex)	**-**	-

Special Features (Available at additional cost) (Insert a 0 if the option is not included, or a 1 if it is included)
Safe Torque Off (STO) ⑤
Encoder Divider / Simulated Encoder Output
UL Recognized Component

Mounting Configuration					
2	2-Axis Chassis	**4**	4-Axis Chassis	**5**	5-Axis Chassis

Multi-Axis Package Configuration	
A	Built In Regen Clamp with Dissipation Resistor (Standard)
B	No Built In Regen Clamp
C	Custom (Contact Glentek)

Number of Drive Modules Installed			
1	1 Drive Module (2-Axis Chassis)	**4**	4 Drive Modules (4-Axis Chassis)
2	2 Drive Modules (2-Axis Chassis)	**5**	5 Drive Modules (5-Axis Chassis)
3	3 Drive Modules (4-Axis Chassis)	-	-

Fan Voltage			
1	115 VAC	**2**	230 VAC