

SYSTEM OVERVIEW

Kollmorgen GOLDLINE® BH & SERVOSTAR® 600 Systems

**Kollmorgen GOLDLINE® BH** SEE PAGE 32

Kollmorgen GOLDLINE BH servomotors build on the tradition of high performance servomotors from Kollmorgen. Designed around the classic industry-standard Kollmorgen GOLDLINE series, the BH motors incorporate the highest energy rare earth neodymium-iron-boron magnets and excellent thermal design to provide exceptional continuous torque and peak torque performance in a compact package.

- 0.52 to 91.67 lb-ft (0.7 to 124.3 N-m) continuous torque
- 70.0 to 190 mm (2.76 to 7.5 inches) square frame
- 400/480 VAC, 565/680 VDC bus rated
- Compact (high torque/volume ratio)
- Speeds to 7500 rpm standard
- Rugged resolver feedback
- IPM (Interior Permanent Magnet) design for low cogging
- CE compliant, UL recognized
- Built-in thermostat
- Rear shaft extension for mounting additional feedback devices
- Class H insulation system
- Rotating CE connectors standard on 12x, 22x, 42x
- Terminal box standard on 62x and 82x frames
- MH Medium inertia series for high inertia load applications

SERVOSTAR® 600 SEE PAGE 34

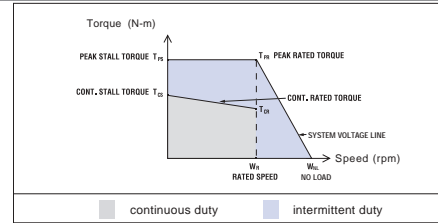
The SERVOSTAR 600 is a high performance, high power drive accepting 208-480 VAC and producing from 3-70 A_{RMS} continuous. In combination with Kollmorgen GOLDLINE series motors (BH, XT, DDR) and Kollmorgen PLATINUM® DDL-series motors, it offers the highest power, most advanced features, and broadest connectivity in the global marketplace. The integrated power supply makes it ideal for single and multi-axis applications.

Features

- Fully protected
- Meets CE and UL requirements
- Built-in features minimizes total machine cost by eliminating the need for external hardware
- Small footprint - CE Filters in 3-20 A (standard) units and option cards are contained inside the drive
- Digital position and velocity control
- Position generator supports trapezoidal and sinusoidal acceleration
- Motion Tasking support tied to I/O
- Interface through analog command, digital I/O, pulse direction or encoder follower, and fieldbuses
- Built-in CANOpen support

SYSTEM OVERVIEW

Kollmorgen GOLDLINE® BH & SERVOSTAR® 600 Systems



RECOMMENDED MOTOR/DRIVE SYSTEMS, 400 VAC

Servo Motor Model	Servo Drive Model	Peak Stall Torque T_{FS} N-m (lb-in)	Peak Rated Torque T_{FR} N-m (lb-in)	Cont. Stall Torque T_{CS} N-m (lb-in)	Cont. Rated Torque T_{CR} ^① N-m (lb-in)	Rated Speed W_R rpm	No-Load Speed W_{NL} rpm	Cont. Stall Current I_{CS} A_{RMS}	Current at Peak Torque I_{PS} A_{RMS}	Inertia ^④ J kgm ² (lb-in ²)	Inductance Line-Line L mH
BH Series motors with SERVOSTAR 600 Drives											
BH-122-A ②	S603	2.4 (21.2)	1.90 (16.8)	0.70 (6.2)	0.56 (4.9)	6,000	n/a	1.0	3.6	0.000309 (0.000273)	120
BH-124-B ②	S603	4.2 (37.2)	3.98 (35.2)	1.3 (11.5)	1.11 (9.8)	6,000	n/a	1.8	6	0.000461 (0.000408)	58
BH-126-B ②	S603	4.2 (37.2)	3.98 (35.2)	1.9 (16.8)	1.56 (13.8)	6,000	n/a	2.6	6	0.000765 (0.000677)	37.6
BH-222-E ②	S603	4.8 (42.5)	4.05 (35.8)	2.1 (18.6)	1.80 (15.9)	5,300	n/a	2.5	6	0.000997 (0.000882)	74
BH-224-G ②	S603	7.3 (64.6)	5.98 (52.9)	3.8 (33.6)	3.33 (29.5)	3,600	n/a	2.9	6	0.000251 (0.002222)	90
BH-226-C ②	S606	14.2 (126)	13.2 (117)	5.6 (49.6)	4.54 (40.2)	4,000	n/a	4.46	12	0.000251 (0.002222)	44
BH-226-E ②	S603	10.5 (92.9)	8.91 (78.9)	5.6 (49.6)	5.13 (45.4)	2,500	n/a	3.0	6	0.000251 (0.002222)	92
BH-422-D ③	S606	16.5 (146)	13.5 (119)	5.8 (51.3)	4.63 (41)	3,600	n/a	4.0	12	0.000323 (0.002859)	89
BH-424-D ③	S606	20 (177)	18.8 (166)	10.5 (92.9)	8.90 (78.8)	3,000	n/a	6.3	12	0.000656 (0.005806)	60
BH-426-B ③	S610	37.1 (328)	37.1 (328)	15.8 (140)	13.3 (118)	2,500	n/a	8.1	20	0.000929 (0.008222)	48
BH-426-C ③	S614	33.2 (294)	29.3 (259)	15.5 (137)	12.7 (112)	4,200	n/a	12.4	28	0.000929 (0.008222)	19.2
BH-622-A ③	S606	40.0 (354)	30.5 (270)	14.6 (129)	12.4 (110)	1,600	n/a	4.17	12	0.00103 (0.009116)	128
BH-622-B ③	S610	33.5 (297)	33.5 (297)	14.9 (132)	11.6 (103)	3,000	n/a	8.43	20	0.00103 (0.009116)	32
BH-624-C ③	S620	56.2 (497)	52.1 (461)	25.2 (223)	18.8 (166)	3,750	n/a	17	40	0.00203 (0.017967)	11.7
BH-624-D ③	S614	54.8 (485)	49.5 (438)	25.6 (227)	21.0 (186)	2,750	n/a	12.4	28	0.00203 (0.017967)	23
BH-624-E ③	S614	46.9 (415)	41.2 (365)	25.6 (227)	21.1 (187)	3,200	n/a	14.5	28	0.00203 (0.017967)	17
BH-624-G ③	S610	46.8 (414)	44.1 (390)	24.7 (219)	19.8 (175)	2,100	n/a	10.5	20	0.00203 (0.017967)	32
BH-626-C ③	S610	82.9 (734)	78.2 (692)	36.6 (324)	31.2 (276)	1,250	n/a	8.4	20	0.00304 (0.026906)	61
BH-626-E ③	S620	68 (602)	67 (593)	35.4 (313)	30.1 (266)	3,000	n/a	19.7	40	0.00304 (0.026906)	10.7
BH-822-C ③	S610	81.6 (722)	64.2 (568)	34.8 (308)	29.3 (259)	1,300	n/a	8.1	20	0.00488 (0.043192)	110
BH-822-D ③	S620	72.7 (643)	46.4 (411)	34.7 (307)	29.2 (258)	2,500	n/a	18.1	40	0.00488 (0.043192)	20.8
BH-824-B ③	S620	95.0 (841)	69 (611)	50 (443)	44.5 (394)	1,650	n/a	20	40	0.008406 (0.074399)	29.3
BH-824-D ③	S640	158.0 (1398)	51.5 (456)	66.3 (587)	41.0 (363)	2,700	n/a	31.9	80	0.008406 (0.074399)	11
BH-826-A ③	S620	163 (1443)	147 (1301)	93.5 (828)	81.4 (720)	1,250	n/a	21.8	40	0.0126 (0.111519)	30
BH-826-C ③	S640	178 (1575)	100 (885)	92.9 (822)	45 (398)	2,500	n/a	39.7	80	0.0126 (0.111519)	9
BH-828-B ③	S670	300 (2655)	150 (1328)	124.3 (1100)	78 (690)	2,500	n/a	53	140	0.0168 (0.148693)	4.7
BH-828-E ③	S640	230.5 (2040)	183 (1620)	122.8 (1087)	89.5 (792)	3,200	n/a	39.1	80	0.0168 (0.148693)	8.05

RECOMMENDED MOTOR/DRIVE SYSTEMS, 480 VAC

Servo Motor Model	Servo Drive Model	Peak Stall Torque T_{FS} N-m (lb-in)	Peak Rated Torque T_{FR} N-m (lb-in)	Cont. Stall Torque T_{CS} N-m (lb-in)	Cont. Rated Torque T_{CR} ^① N-m (lb-in)	Rated Speed W_R rpm	No-Load Speed W_{NL} rpm	Cont. Stall Current I_{CS} A_{RMS}	Current at Peak Torque I_{PS} A_{RMS}	Inertia ^④ J kgm ² (lb-in ²)	Inductance Line-Line L mH
BH Series motors with SERVOSTAR 600 Drives											
BH-122-A ②	S603	2.4 (21.2)	2.16 (19.1)	0.70 (6.2)	0.52 (4.6)	7,500	n/a	1.0	3.6	0.000309 (0.000273)	120
BH-124-B ②	S603	4.2 (37.2)	3.78 (33.5)	1.3 (11.5)	1.06 (9.4)	7,500	n/a	1.8	6	0.000461 (0.000408)	58
BH-126-B ②	S603	4.2 (37.2)	4.07 (36)	1.9 (16.8)	1.47 (13.0)	7,500	n/a	2.6	6	0.000765 (0.000677)	37.6
BH-222-E ②	S603	4.8 (42.5)	4.27 (37.8)	2.1 (18.6)	1.7 (15)	7,000	n/a	2.5	6	0.000997 (0.000882)	74
BH-224-G ②	S603	7.3 (64.6)	6.57 (58.1)	3.8 (33.6)	3.2 (28.3)	4,600	n/a	2.9	6	0.000251 (0.002222)	90
BH-226-C ②	S606	14.2 (126)	14.0 (124)	5.6 (49.6)	4.3 (38.1)	4,900	n/a	4.46	12	0.000251 (0.002222)	44
BH-226-E ②	S603	10.5 (92.9)	9.45 (83.6)	5.6 (49.6)	5.0 (44.3)	3,200	n/a	3.0	6	0.000251 (0.002222)	92
BH-422-D ③	S606	16.5 (146)	14.8 (131)	5.8 (51.3)	4.3 (38.1)	4,600	n/a	4.0	12	0.000323 (0.002859)	89
BH-424-D ③	S606	20 (177)	18.0 (159)	10.5 (92.9)	8.5 (75.2)	3,700	n/a	6.3	12	0.000656 (0.005806)	60
BH-426-B ③	S610	37.1 (328)	37 (327)	15.8 (140)	12.6 (112)	3,200	n/a	8.1	20	0.000929 (0.008222)	48
BH-426-C ③	S614	33.2 (294)	29.8 (264)	15.5 (137)	11.2 (99.1)	5,000	n/a	12.4	28	0.000929 (0.008222)	19.2
BH-622-A ③	S606	40.0 (354)	36 (319)	14.6 (129)	11.8 (104)	2,000	n/a	4.17	12	0.00103 (0.009116)	128
BH-622-B ③	S610	33.5 (297)	30.1 (266)	14.9 (132)	10.5 (92.9)	4,000	n/a	8.43	20	0.00103 (0.009116)	32
BH-624-C ③	S620	56.2 (497)	50.6 (448)	25.2 (223)	15.1 (134)	4,500	n/a	17	40	0.00203 (0.017967)	11.7
BH-624-D ③	S614	54.8 (485)	49.3 (436)	25.6 (227)	18.0 (159)	3,300	n/a	12.4	28	0.00203 (0.017967)	23
BH-624-E ③	S614	46.9 (415)	46.9 (415)	25.6 (227)	18.0 (159)	3,850	n/a	14.5	28	0.00203 (0.017967)	17
BH-624-G ③	S610	46.8 (414)	42.1 (373)	24.7 (219)	18.4 (163)	2,600	n/a	10.5	20	0.00203 (0.017967)	32
BH-626-C ③	S610	82.9 (734)	74.6 (660)	36.6 (324)	29.9 (265)	1,550	n/a	8.4	20	0.00304 (0.026906)	61
BH-626-E ③	S620	68 (602)	68 (602)	35.4 (313)	27.1 (240)	3,700	n/a	19.7	40	0.00304 (0.026906)	10.7
BH-822-C ③	S610	81.6 (722)	73.4 (650)	34.8 (308)	28.0 (248)	1,600	n/a	8.1	20	0.00488 (0.043192)	110
BH-822-D ③	S620	72.7 (643)	65.4 (579)	34.7 (307)	27 (239)	3,000	n/a	18.1	40	0.00488 (0.043192)	20.8
BH-824-B ③	S620	95.0 (841)	89 (788)	50 (443)	39.0 (345)	2,000	n/a	20	40	0.008406 (0.074399)	29.3
BH-824-D ③	S640	158.0 (1398)	66 (584)	66.3 (587)	38.0 (336)	3,000	n/a	31.9	80	0.008406 (0.074399)	11
BH-826-A ③	S620	163 (1443)	146 (1292)	93.5 (828)	72.6 (643)	1,500	n/a	21.8	40	0.0126 (0.111519)	30
BH-826-C ③	S640	178 (1575)	100 (885)	92.9 (822)	38.4 (340)	3,000	n/a	39.7	80	0.0126 (0.111519)	9
BH-828-B ③	S670	300 (2655)	150 (1328)	124.3 (1100)	67.8 (600)	3,000	n/a	53	140	0.0168 (0.148693)	4.7
BH-828-E ③	S640	230.5 (2040)	183 (1620)	122.8 (1087)	89.5 (792)	3,200	n/a	39.1	80	0.0168 (0.148693)	8.05

① Ambient temperature at 40°C (or less).
② Continuous duty ratings are for motor mounted to a 1/4" thick aluminum faceplate of 96 square inches.

③ Continuous duty ratings are for motors mounted to a 1" thick aluminum faceplate of 452 square inches.
④ Inertia includes feedback inertia.

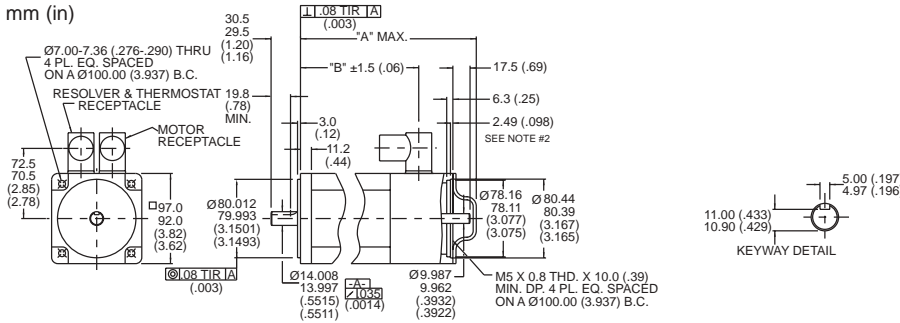
BH SERIES MOTORS

Kollmorgen GOLDLINE® BH & SERVOSTAR® 600 System

SEE SYSTEM INFORMATION ON PAGE 31.

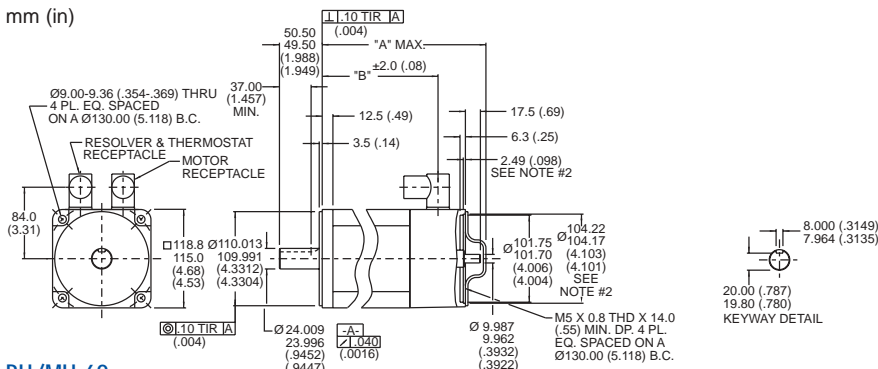
BH/MH-22x

mm (in)



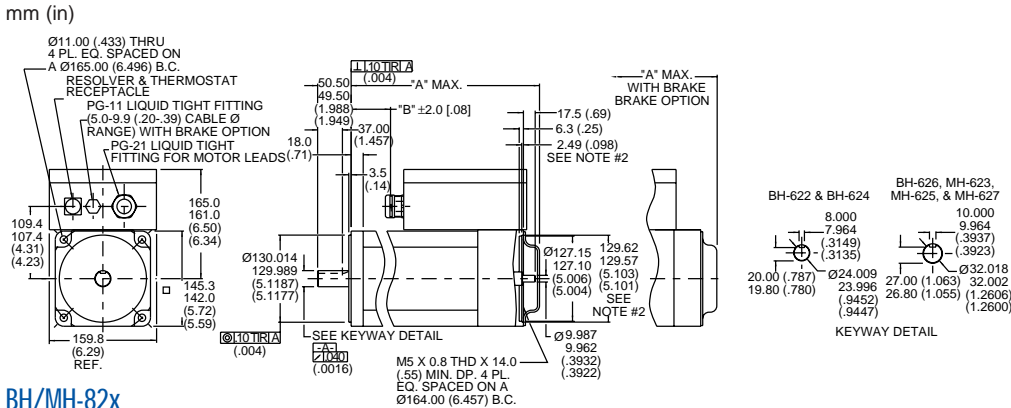
BH/MH-42x

mm (in)



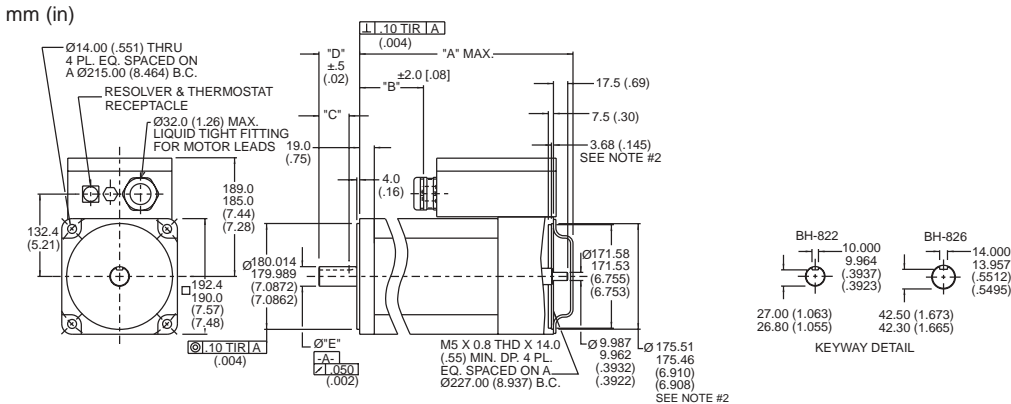
BH/MH-62x

mm (in)



BH/MH-82x

mm (in)



SERVOSTAR® 600 DRIVES

Kollmorgen GOLDLINE® BH & SERVOSTAR® 600 Systems



SERVOSTAR® 600 FEATURES

Servo Control

- Easy to tune servo loops
- Advanced sinewave commutation technology provides smooth, precise low-speed control and high speed performance
- Velocity loop bandwidths to 400 Hz
- DQ Current control increases high speed peak torque performance for faster cycle rates
- Space Vector Modulation reduces normal power stage switching losses
- Torque angle control enhances motor performance
- Fully digital control loops
- Compact and attractive rugged metal package for space-saving, modern appearance - metal package minimizes electrical noise emission & susceptibility
- Command modes: Torque, Velocity, Position, Electronic Gearing Pulse Following, and Motion Task
- Seven current ratings: 3, 6, 10, 14, 20, 40 and 70 amp RMS/phase continuous
- 2 to 1 peak/continuous current rating (5 second at peak) (S610-30 has 3:1 peak/cont.)

Easy Connectivity

- PROFIBUS-DP communication option card
- DeviceNet communication option card
- Built in encoder equivalent output can eliminate the need for an additional position feedback device
- RS-232 Communication
- Unique multi-drop configuration allows a PC or PLC to communicate to multiple SERVOSTAR 600 amplifiers via single RS-232 connection
- SERVOSTAR 600's versatile communication capabilities make it easy to integrate machine control data directly from the factory floor to your information system
- Analog ± 10 V, pulse/direction, master encoder, and serial port, I/O command options

Robust Design

- ESD rugged circuit design and fully metallic enclosure
- Full protection against short circuit, overvoltage, undervoltage, heatsink overtemperature, motor overtemperature, overspeed, overcurrent, and feedback loss
- UL , cUL listed, and CE
- Built-in line filter for CE (models up to 20 amp)
- Flash memory

Windows Start-up Environment

- Graphical environment simplifies set up
- PC "Oscilloscope" for measuring real-time motion performance
- Graphical Motion tasking: fully graphical programming environment provides single-axis control capability
- On-board Dynamic Signal Analyzer (DSA) generates Bode plots to improve servo tuning.

Configurable I/O

- 2 separate analog inputs (14 and 12 bit resolution) configurable to 6 different command modes

- 2 analog outputs
- 4 digital inputs
- 2 digital outputs
- I/O can be configured to a variety of functions to customize the SERVOSTAR 600 to individual machines

I/O Option Card

- Adds 14 additional digital inputs and 8 digital outputs
- All I/O are optically isolated
- Simple plug in to top face of amplifier

Regenerative Power Sharing

- Patented circuitry allows the DC bus from two or more amplifiers to be connected together allowing regen power to be shared among multiple drives

Optional Built-in Safety Relay

- Switches off the power stage to ensure personnel safety and prevents an unintended restart of the drive, even in the event of a fault
- Allows DC bus to remain on

Motion Capabilities

The SERVOSTAR 600 can be configured to perform motion control that normally requires a fully programmable drive with a motion language. With the SERVOSTAR 600 there is no programming language to learn; the user only "fill in the blanks" to create common motion tasks

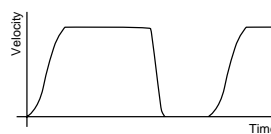
- Fully graphical programming environment
- Make decisions in real time
- Set parameters in real time
- Up to 180 motion tasks can be stored in permanent memory
- Motion Tasks can be linked together.
- Linking of motion tasks (sequencing)
- 10 types of homing
- Speed profile/registration control
- Adjustable S curve acceleration
- Absolute and relative (index) moves
- Adjustable Following-Error window
- Adjustable window for the In Position signal

Linked motion tasks are started:

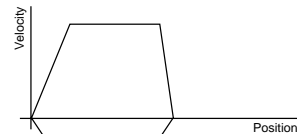
- Immediately upon reaching a targeted position
- From a Digital Input upon reaching the targeted position
- At Preset Time Delay after the targeted position is reached

MOTION EXAMPLES

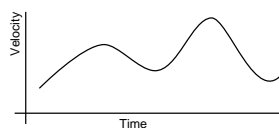
INCREMENTAL MOVE



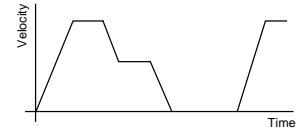
ABSOLUTE MOVE



ELECTRONIC GEARING 5:1 (MASTER/SLAVE)



BLENDED MOVE



APPLICATION EXAMPLES

- Material handling
- Bottle making
- Packaging
- Soft positioning
- Robot
- Conveyor belt controlling
- Fast positioning
- Special cleaning process
- Part selection
- Glass processing
- Wirepuller
- Textile industry
- Printing
- Electronics
- Web converting
- Cut to length

SERVOSTAR® 600 DRIVES

Kollmorgen GOLDLINE® BH & SERVOSTAR® 600 Systems

AMPLIFIER SPECIFICATIONS

Electrical characteristics

- Closed loop velocity bandwidth up to 400 Hz
- Motor current ripple frequency 16 kHz
- Switching frequency: 8 kHz
- Long term speed regulation (0.01%)
- Position loop update rate 250 µs (4 kHz)
- Velocity loop update rate 62.5 µs (16 kHz)
- Commutation update rate 62.5 µs (16 kHz)
- SVM Current loop update rate 62.5 µs (16 kHz)

Fault protection

- Output phase to phase and phase to ground short circuit protection
- Overvoltage
- Undervoltage
- Overtemperature (motor and amplifier)
- Overspeed
- Overcurrent
- Feedback loss
- Foldback
- Supply loss
- Excessive position error

Environmental

- Operation range
 - Ambient 0 to 45°C (derated above ambient up to 55°C)
 - Storage -25°C to 55°C
- Humidity (non-condensing) max. 85%

Velocity Loop Compensation

- PI Plus controller (PDF Format) or PI controller
- Field tunable and digital repeatability

Position Loop Compensation

- Proportional loop with Feed Forward

Analog I/O

- 2 Configurable Inputs: ±10 V, 12 and 14 bit resolution
- 2 Configurable Outputs: ±10 V, 10 bit resolution

Digital I/O

- 4 Configurable Inputs: 24 volts, PLC-compatible
- 2 Configurable Outputs: 24 volts (open collector), PLC-compatible
- Remote enable Input: 24 V, PLC-compatible Drive Status Relay (BTB/RTO)
- Contact closure rated for 0.5 amps, 24 volt

Pulse or Master/Slave Input

- Pulse command: pulse/direction or quadrature encoder format
- RS-485 receivers
- Up to 16 slave amplifiers can be connected together
- Input ratio is configurable

Position Feedback For User (Encoder Equivalent Output Port)

- Configurable to Encoder Equivalent (ROD) or SSI format
- Encoder Equivalent (ROD): A Quad B with Marker (zero) pulse, RS-485 driver
- SSI (serial synchronous interface): max clock frequency is 1.5 Mhz, RS-485 driver
- Programmable resolution

I/O Extension Card (Option)

- Field Installable
- 14 Digital Inputs 24 V, PLC-compatible
- 8 Digital Outputs 24 V, PLC-compatible
- 24 V PLC Interface

Communications

- RS-232 Interface

Motor Feedback

- Resolver, Sine Encoder

Power Regeneration Options

- Internal
- External - using BAR housed resistors
- Bus Sharing - Distributes regen power among multiple amplifiers

Built-in Parameter Unit

- Displays drive status information
- Parameters: drive address, baud rate, velocity loop tuning, motor type, position output information format, brake, regen type

Motor Brake Control

- 24 V optional holding brake in the motor can be controlled directly by the SERVOSTAR 600

Power Inputs

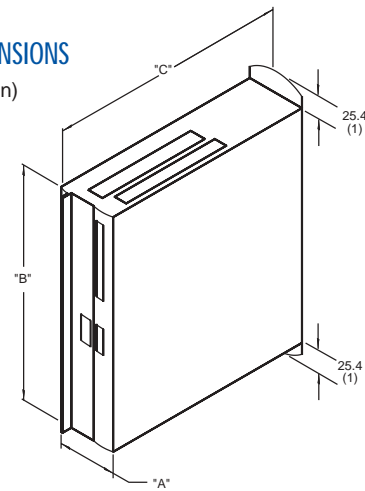
- 208-480 VAC 3 phase, 50 or 60 Hz, built in line filter for CE requirements (models up to 20 amps)
- 24 VDC @ 1 amp (3 amps with brake) For Logic

AMPLIFIER RATINGS

Model	S603	S606	S610	S610-30	S614	S620	S640	S670
Output Continuous Current Per Phase (RMS/phase)	3	6	10	10	14	20	40	70
Output Peak Current Per Phase (5 sec)	6	12	20	30	28	40	80	140
Rated Input Power (KVA) @ 480 V	2.3	4.6	8.1	16.6	11.6	16.6	30	50
Internal Power Dissipation Watts	40	60	90	90	160	200	400	700
AC Input Line Voltage (3 phase)	208-480	208-480	208-480	208-480	208-480	208-480	208-480	208-480
Continuous Regen Power Internal Watts	80	200	200	200	200	200	N/A	N/A
External Watts	500	1,500	1,500	1,500	1,500	1,500	6,000	6,000

DIMENSIONS

mm (in)



MODEL	SIZE (amp)	DIM "A"	DIM "B"	DIM "C"
				NO CONN.-WITH CONN
S603	3	70 (2.8)	275 (10.8)	265 (10.4)-273 (10.7)
S606	6	70 (2.8)	275 (10.8)	265 (10.4)-273 (10.7)
S610	10	70 (2.8)	275 (10.8)	265 (10.4)-273 (10.7)
S610-30	10	70 (2.8)	275 (10.8)	265 (10.4)-273 (10.7)
S614	14	100 (3.9)	275 (10.8)	265 (10.4)-273 (10.7)
S620	20	120 (4.7)	275 (10.8)	265 (10.4)-273 (10.7)
S640	40	250 (9.8)	495 (19.5)	300 (11.8)-325 (12.8)
S670	70	250 (9.8)	495 (19.5)	300 (11.8)-325 (12.8)