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Systems
Technical
Publication

Kollmorgen **GOLD**LINE™ Motors with SERVO**STAR**™



Kollmorgen **GOLD**LINE series motors provide optimum value and performance in a wide variety of applications. The Kollmorgen **GOLD**LINE series incorporates high energy rare earth neodymium-iron-boron magnets and excellent thermal design to provide exceptional continuous torque performance and acceleration capabilities in a compact package. When combined with the SERVO**STAR** digital amplifier, the system becomes an easy to set up, high performance motion control system. The full line of Kollmorgen **GOLD**LINE motor options is available when used with the SERVO**STAR** amplifier. This includes the B series (low inertia), M series (medium inertia), and EB series (explosion proof) motors.

KOLLMORGEN
Motion Technologies Group

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INTRODUCTION



Kollmorgen SERVOSTAR™ Amplifier

- **115 or 230 Volt AC Input Power (to PA Power Supply)**
- **Resolver Feedback Standard**
- **Fully Digital Control**

The Kollmorgen SERVO**STAR**™ amplifier is a compact, fully digital amplifier designed to simplify installation and system set-up. Three control algorithms and self-tuning (to the load) functionality allows high performance operation to be achieved quickly and easily.

Since not one control algorithm is best for all machines, SERVOSTAR contains Pole Placement, PI, and PDFF control algorithms. SERVOSTAR utilizes the PC-based "MOTIONLINK" for Windows which automatically takes you through the key steps of installation and start up.

FEATURES:

Servo Control
- Advanced sinewave commutation technology provides smooth, precise low-speed control and high-speed performance
- Precision torque control due to precision balanced current loops with closed loop sensors
- Velocity loops bandwidths to 170 Hz
- Self-tuning to the load
- Patented torque angle control that enhances motor performance
- Fully digital control loops
- Compact and attractive rugged metal package for space-saving, modern appearance
- Pole Placement, PI, and PDFF control options
- Velocity or torque control
- Analog or serial command
- Six current ratings: 3, 6, 10, 20, 30, and 55 amps RMS/phase continuous

Easy Connectivity
- Built in encoder equivalent output which can eliminate the need for an additional position feedback device
- Unique multi-drop configuration allows a PC or PLC to communicate to multiple SERVOSTAR amplifiers via single RS-232 connection
- SERVOSTAR's versatile communication capabilities make it easy to integrate machine control data directly from the factory floor to your information system

Robust Design
- Excellent protection against miss-wired connection on 24 volt I/O
- ESD rugged circuit design and fully metallic enclosure
- Self-protecting intelligent power modules
- Full protection against short circuit, overvoltage, undervoltage, heatsink overtemperature, motor overtemperature, overspeed, overcurrent, and feedback loss
- UL, ULC, and CE approval pending

Windows Start up Environment
- Advanced motion "wizard" automatically walks you through set-up
- PC "Oscilloscope" for measuring real-time motion performance

PA Series Power Supply
- PTC resistive soft-start technology eliminates nuisance tripping of fuses or breakers
- Four Power Supply options for optimal configuration of single and multi-axis systems

OPTIONS:

- Encoder/hall feedback
- Separate inputs for logic and bus voltages allow communications to SERVOSTAR without the bus power applied (PA28, PA50, and PA75 models)

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INTRODUCTION



Kollmorgen GOLDLINE Series

- **0.62 to 82.0 lb-ft (0.84 to 111.2 N-m)**
- **70.0 to 190.0 mm (2.76 to 7.48 inches) Square Frame**
- **Resolver Feedback**
- **Maximum Recommended Speed 7500 RPM**

Kollmorgen GOLDLINE servomotors incorporate 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.

The brushless lightweight servomotor base models come with integral frameless resolver and industrial grade connectors (B and M models).

These servomotors are available in three basic models to meet the needs of a wide range of applications.

B-Series (low inertia)
The B-Series provides extremely low inertia rotors allowing optimum performance in applications requiring rapid acceleration and deceleration.

M-Series (medium inertia)
The M-Series is an extension of the B-Series. With seven times higher inertia, this motor series offers the advantage of better performance for systems having complaint loads or large inertia mismatches.

EB-Series (explosion proof)
Explosion-Proof Brushless servomotors are listed by UL for use in Class 1, Division 1, Groups C and D hazardous locations. This listing includes applications where vapors or gases form flammable or explosive environments.

The EB-Series has been tested and proven capable to withstand internal explosion without bursting or allowing ignition to reach outside the motor frame. Contact your local regional sales office for more information.

FEATURES: B or M Series

- Small (large torque/volume ratio)
- Speeds to 7500 RPM standard
- UL recognized
- Rugged resolver feedback
- Built-in thermostat
- Rear shaft extension
- Class H insulation
- IP-65 sealing

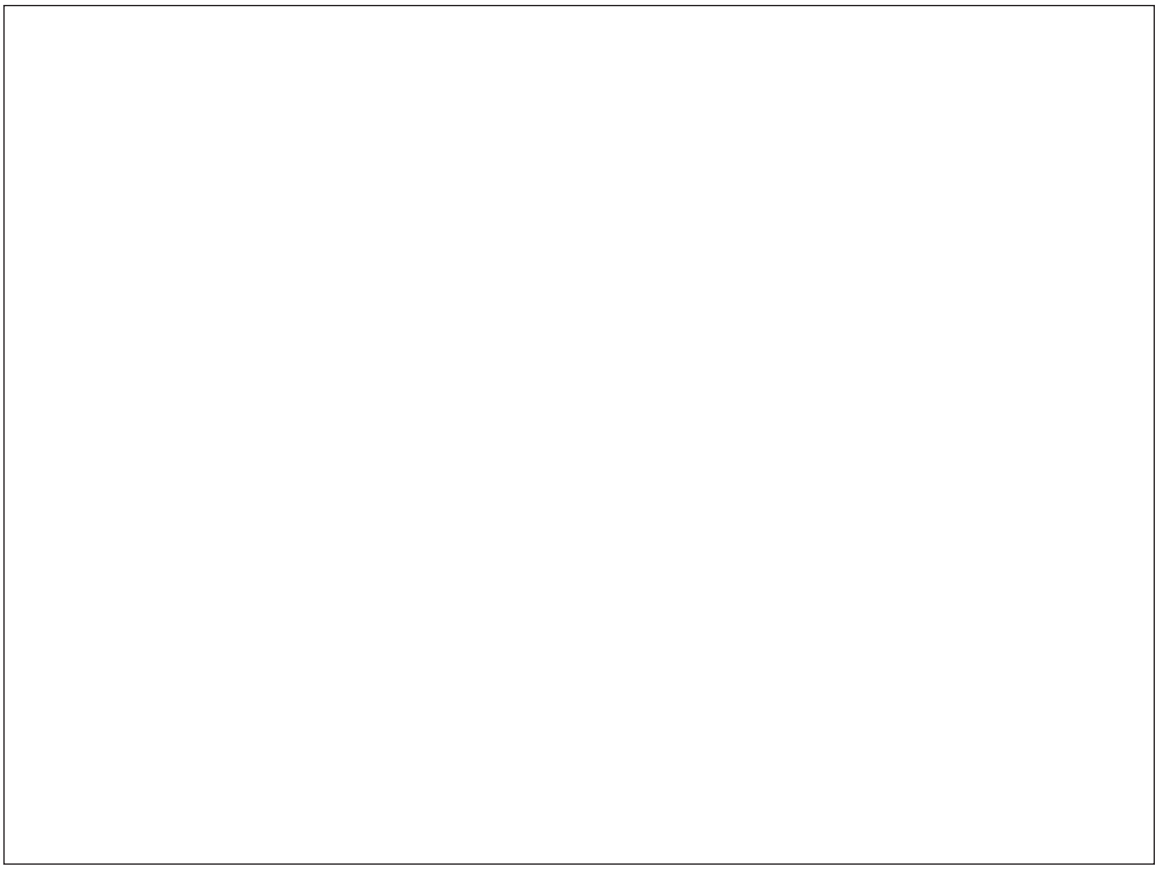
OPTIONS:

- Front mounted gearheads
- IP-67 sealing
- Fail-safe brake
- Encoder feedback
- NEMA mountings
- Mating connectors

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AUTO SET-UP

MOTIONLINK for Windows takes the fear out of setting up a servo system. Designed for the novice as well as the advanced user, MOTIONLINK lets users quickly set-up and fine tune system performance.



The SERVOSTAR Auto Set-up consists of five steps to completely configure the SERVOSTAR and motor for your machine:

1. Set SERVOSTAR for the Power Source. MOTIONLINK will tell you if your SERVOSTAR was factory programmed for a line voltage. Push okay, if correct, if not, change to the appropriate voltage.

2. Set SERVOSTAR up for the Motor. If the amplifier has been programmed to operate a specific motor, MOTIONLINK will indicate the motor type. Push okay and go to the next step. If not, you can select from a listing of standard Kollmorgen motors or enter in the specific parameters from the motors you will be using.

3. Select the Operational Mode. Set SERVOSTAR to run in velocity or current mode. Set the command to be serial or analog.

4. Tune SERVOSTAR for the Load. Simply select the bandwidth you want the system to operate and press the Auto-tune button .

5. Store SERVOSTAR Settings : The final step is storing the parameters in ServoStar and on your hard drive or disk.

Now you're ready to run your machine!

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ADDITIONAL FUNCTIONS

MOTIONLINK also includes other features that allow you to fine tune or monitor the performance of the system.

PC Oscilloscope: For closely evaluating system performance MOTIONLINK includes the functionality of an oscilloscope. You can very easily excite the load then review performance graphically on your computer screen.

Direct Terminal Mode: This mode turns your computer into a "dumb terminal". Variables or parameters can be monitored and changed using the SERVOSTAR's command language. This mode is ideal for advanced users who want to get directly in the "heart" of the SERVOSTAR.



Selectable Tuning Algorithms: No one control scheme is ideal for all applications. SERVOSTAR has three control schemes to choose from: Pole Placement (Standard), PI, and PDFF. Although the Pole Placement will meet the needs of most applications, PI and PDFF control is also available. So whether your critical need is steady speed control, high accelerations or quick response to load variations, etc., SERVOSTAR provides the greatest opportunity to achieve the best machine performance.

Monitor Mode: Allows you to jog the motor to monitor key operation variables. Speed and torque can be viewed in real time in linear gauge format. Up to three variables can be monitored at a time.

MOTIONLINK includes many other features like:

- Setting resolution of encoder "equivalent" output
- Activating position limits
- Displaying amplifier status
- Setting acceleration amps
- Limiting max speed or torque

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PROGRAMMABLE FUNCTIONS

SERVOSTAR can be programmed and monitored using MOTIONLINK , a “dumb” terminal, or from a PC, PLC, or motion controller that is running the machine.

Function	Programmable	Monitor
Amplifier Operation Mode	Serial Velocity, Analog Velocity, Serial Torque, Analog Torque	Present Operating Mode
Motor Torque Control	Peak Current, Continuous Current, Motor Current Command	Actual Motor Torque
Motor Velocity Control	Accel/Decel Rates, Accel/Decel Ramp, Jog, Stop, Max Speed, Step	Actual Motor Velocity
Amplifier Configuration and Status	Analog Scaling, Offset and Deadband, Drive Configuration Parameters	Travel Limit Switch Status, Drive Status, Fault Relay Status, Error Messages, Firmware Version, Amplifier Run Time
Amplifier Enabling/Disabling	Enable, Disable, Kill, Decelerate at preset rate	Drive Enabled and Power Applied to Motor, Any Faults Present
Servo Loop Compensation and Gain	Three Compensation Types: - PI - PDFF - Pole Placement	Status of all Tuning Parameters
Digital “Oscilloscope”	Record Functions	Motor Speed, Current
Motor Parameters (Note: For KMTG Standard Motors this Information Stored in MOTIONLINK and can be Stored in E^2PROM when Shipped From Factory)	Name, Back EMF Constants, Resistance, Current Ratings, Number of Poles, Max Speed, Inertia, Torque Constant, Inductance, Resolver or Encoder Parameters	Status of all Motor Parameters Stored in Amplifier
Serial Communication Protocol	Character Echo, System Prompt, Enable Power up, and Receive Error Messages	Multi-drop Address Hardware Setting
Motor Thermostat	How Amplifier Responds When Motor Thermostat Opens	Thermostat Status

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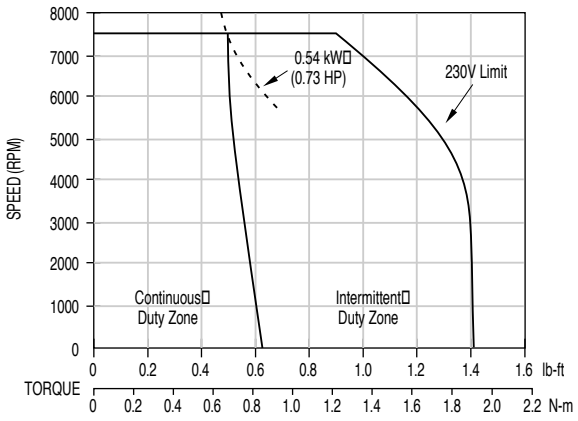
SYSTEM SUMMARY INFORMATION

System Summary

Motor	Feedback	Continuous Torque lb-ft (N-m)	Peak Torque lb-ft (N-m)	Continuous Power HP (kW)	Max Speed RPM	Amplifier	Amplifier Cont / Peak Current Rating (RMS/Phase)
B-102-A M-103-A	Resolver	0.62 (0.84)	1.41 (1.91)	0.73 (0.54)	7500	SR03	3/6
B-106-B M-107-B	Resolver	1.64 (2.2)	3.09 (4.2)	2.0 (1.49)	7500	SR06	6/12
B-204-C M-205-C	Resolver	3.53 (4.79)	7.01 (9.5)	3.8 (2.83)	6200	SR10	10/20
B-206-C M-207-C	Resolver	4.75 (6.44)	9.3 (12.6)	3.8 (2.83)	4900	SR10	10/20
B-404-C M-405-C	Resolver	9.7 (13.1)	17.8 (24.1)	7.3 (5.4)	5000	SR20	20/40
B-406-B M-407-B	Resolver	13.7 (18.6)	27.4 (37.2)	7.4 (5.5)	3200	SR20	20/40
B-602-B M-603-B	Resolver	12.8 (17.4)	21.2 (28.7)	7.7 (5.7)	4000	SR20	20/40
B-604-A M-605-A	Resolver	22.2 (30.1)	44.4 (60.2)	8.0 (6.0)	2150	SR20	20/40
B-606-D M-607-D	Resolver	31.0 (42.0)	66.0 (89.5)	11.0 (8.2)	2300	SR30	30/60
B-802-A M-803-A	Resolver	31.0 (42.0)	69.5 (94.2)	10.6 (7.9)	2000	SR30	30/60
B-806-A M-807-A	Resolver	80.0 (108.5)	170.0 (230.5)	20.5 (15.3)	1550	SR55	55/110

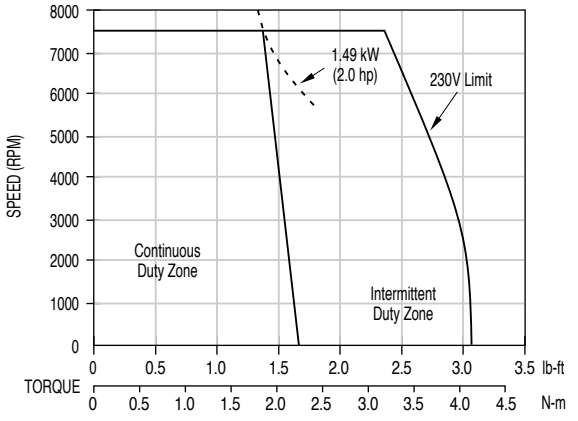
1 ■ Motor B-102-A or M-103-A ■ Amplifier SR03

Performance Specification	Symbol	Units	
Cont. Torque at stall	Tc	lb-ft	0.62
		N-m	0.84
Peak Torque at stall	Tp	lb-ft	1.41
		N-m	1.91
Cont. Power	HP rated	HP	0.73
	kW rated	kW	0.54
Max Speed	N	RPM	7500
Motor Inertia x 10^4 B Series	Jm	lb-ft-s^2	0.228
		kg-m^2	0.309
M Series		lb-ft-s^2	1.56
		kg-m^2	2.12
Motor Weight B Series	Wt	lb	5.5
		kg	2.5
M Series		lb	7.0
		kg	3.2



2 ■ Motor B-106-B or M-107-B ■ Amplifier SR06

Performance Specification	Symbol	Units	
Cont. Torque at stall	Tc	lb-ft	1.64
		N-m	2.2
Peak Torque at stall	Tp	lb-ft	3.09
		N-m	4.2
Cont. Power	HP rated	HP	2.0
	kW rated	kW	1.49
Max Speed	N	RPM	7500
Motor Inertia x 10^4 B Series	Jm	lb-ft-s^2	0.564
		kg-m^2	0.765
M Series		lb-ft-s^2	4.0
		kg-m^2	5.4
Motor Weight B Series	Wt	lb	8.5
		kg	3.9
M Series		lb	11.0
		kg	5.0

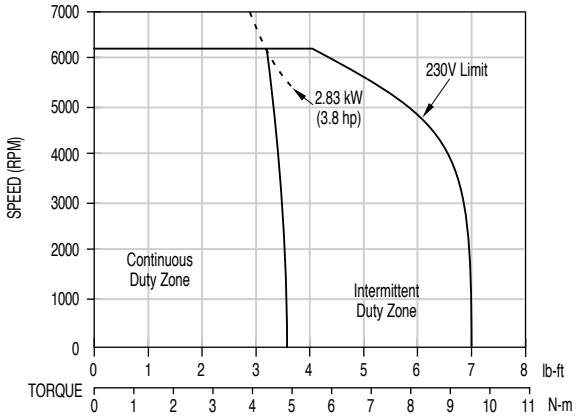


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SYSTEM SUMMARY INFORMATION

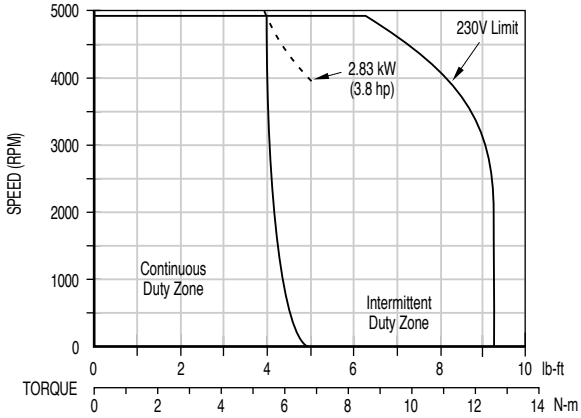
3 ■ Motor B-204-C or M-205-C ■ Amplifier SR10

Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	3.53
			N-m	4.79
Peak Torque at stall		Tp	lb-ft	7.01
			N-m	9.5
Cont. Power		HP rated	HP	3.8
		kW rated	kW	2.83
Max Speed		N	RPM	6200
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	1.275
			kg-m^2	1.729
	M Series		lb-ft-s^2	8.43
			kg-m^2	11.43
Motor Weight	B Series	Wt	lb	13.6
			kg	6.2
	M Series		lb	16.0
			kg	7.3



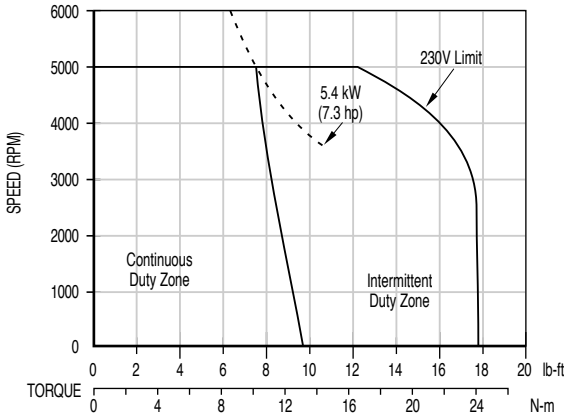
4 ■ Motor B-206-C or M-207-C ■ Amplifier SR10

Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	4.75
			N-m	6.44
Peak Torque at stall		Tp	lb-ft	9.3
			N-m	12.6
Cont. Power		HP rated	HP	3.8
		kW rated	kW	2.83
Max Speed		N	RPM	4900
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	1.853
			kg-m^2	2.512
	M Series		lb-ft-s^2	13.0
			kg-m^2	18.0
Motor Weight	B Series	Wt	lb	16.7
			kg	7.6
	M Series		lb	21.0
			kg	9.5



5 ■ Motor B-404-C or M-405-C ■ Amplifier SR20

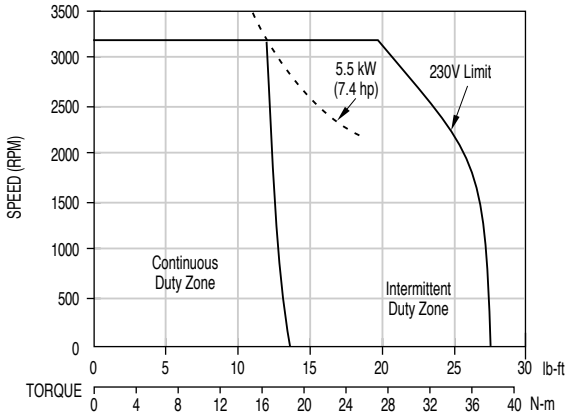
Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	9.7
			N-m	13.1
Peak Torque at stall		Tp	lb-ft	17.8
			N-m	24.1
Cont. Power		HP rated	HP	7.3
		kW rated	kW	5.4
Max Speed		N	RPM	5000
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	4.84
			kg-m^2	6.56
	M Series		lb-ft-s^2	32.5
			kg-m^2	44.6
Motor Weight	B Series	Wt	lb	27.5
			kg	12.5
	M Series		lb	34.0
			kg	15.5



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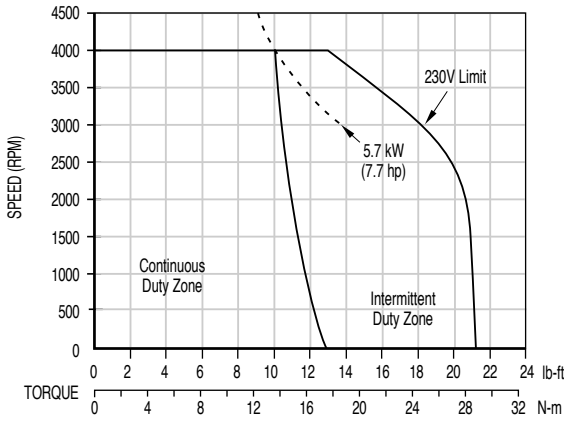
6 ■ Motor B-406-B or M-407-B ■ Amplifier SR20

Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	13.7
			N-m	18.6
Peak Torque at stall		Tp	lb-ft	27.4
			N-m	37.2
Cont. Power		HP rated	HP	7.4
		kW rated	kW	5.5
Max. Speed		N	RPM	3200
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	6.85
			kg-m^2	9.29
	M Series		lb-ft-s^2	48.5
			kg-m^2	65.7
Motor Weight	B Series	Wt	lb	35.0
			kg	15.9
	M Series		lb	44.0
			kg	20.0



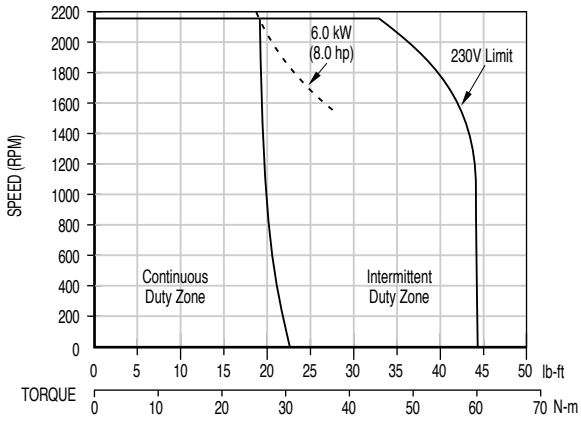
7 ■ Motor B-602-B or M-603-B ■ Amplifier SR20

Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	12.8
			N-m	17.4
Peak Torque at stall		Tp	lb-ft	21.2
			N-m	28.7
Cont. Power		HP rated	HP	7.7
		kW rated	kW	5.7
Max. Speed		N	RPM	4000
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	7.58
			kg-m^2	10.28
	M Series		lb-ft-s^2	57.2
			kg-m^2	77.5
Motor Weight	B Series	Wt	lb	37.0
			kg	16.8
	M Series		lb	44.0
			kg	20.0



8 ■ Motor B-604-A or M-605-A ■ Amplifier SR20

Performance Specification		Symbol	Units	
Cont. Torque at stall		Tc	lb-ft	22.2
			N-m	30.1
Peak Torque at stall		Tp	lb-ft	44.4
			N-m	60.2
Cont. Power		HP rated	HP	8.0
		kW rated	kW	6.0
Max. Speed		N	RPM	2150
Motor Inertia x 10^4	B Series	Jm	lb-ft-s^2	15.0
			kg-m^2	20.34
	M Series		lb-ft-s^2	103.7
			kg-m^2	140.6
Motor Weight	B Series	Wt	lb	51.0
			kg	23.1
	M Series		lb	63.0
			kg	28.7

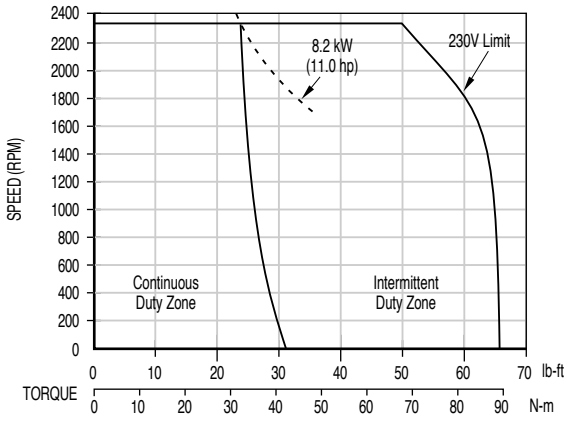


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SYSTEM SUMMARY INFORMATION

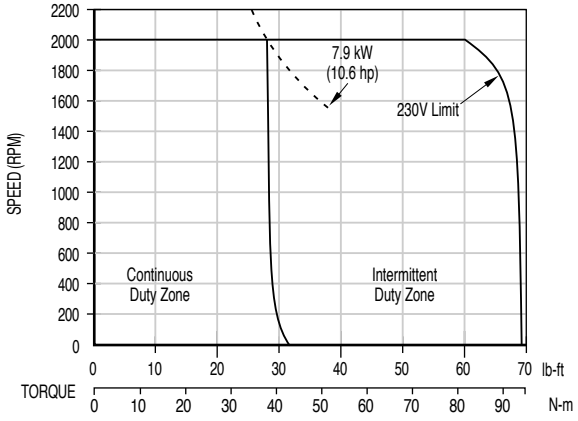
9 ■ Motor B-606-D or M-607-D ■ Amplifier SR30

Performance Specification	Symbol	Units	
Cont. Torque at stall	Tc	lb-ft	31.0
		N-m	42.0
Peak Torque at stall	Tp	lb-ft	66.0
		N-m	89.5
Cont. Power	HP rated	HP	11.0
	kW rated	kW	8.2
Max. Speed	N	RPM	2300
Motor Inertia x 10^4 B Series	Jm	lb-ft-s^2	22.4
		kg-m^2	30.4
M Series		lb-ft-s^2	156.1
		kg-m^2	211.7
Motor Weight B Series	Wt	lb	66.0
		kg	29.9
M Series		lb	83.0
		kg	37.8



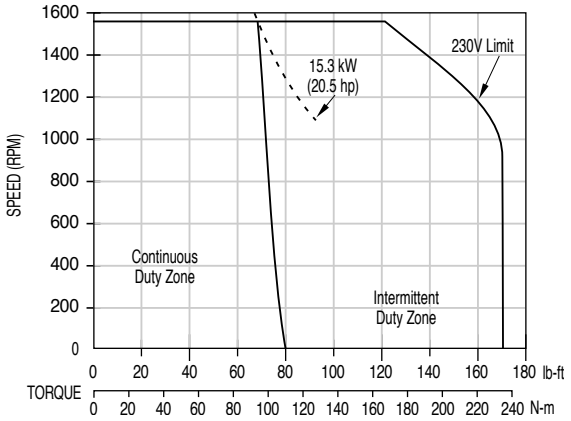
10 ■ Motor B-802-A or M-803-A ■ Amplifier SR30

Performance Specification	Symbol	Units	
Cont. Torque at stall	Tc	lb-ft	31.0
		N-m	42.0
Peak Torque at stall	Tp	lb-ft	69.5
		N-m	94.2
Cont. Power	HP rated	HP	10.6
	kW rated	kW	7.9
Max. Speed	N	RPM	2000
Motor Inertia x 10^4 B Series	Jm	lb-ft-s^2	36.0
		kg-m^2	48.8
M Series		lb-ft-s^2	259.0
		kg-m^2	352.0
Motor Weight B Series	Wt	lb	79.0
		kg	36.0
M Series		lb	96.0
		kg	43.6



11 ■ Motor B-806-A or M-807-A ■ Amplifier SR55

Performance Specification	Symbol	Units	
Cont. Torque at stall	Tc	lb-ft	80.0
		N-m	108.5
Peak Torque at stall	Tp	lb-ft	170.0
		N-m	230.5
Cont. Power	HP rated	HP	20.5
	kW rated	kW	15.3
Max. Speed	N	RPM	1550
Motor Inertia x 10^4 B Series	Jm	lb-ft-s^2	93.0
		kg-m^2	126.0
M Series		lb-ft-s^2	655.0
		kg-m^2	888.0
Motor Weight B Series	Wt	lb	147.0
		kg	67.0
M Series		lb	190.0
		kg	86.5



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AMPLIFIER SPECIFICATIONS

Electrical characteristics
- Closed loop velocity bandwidth up to 170 Hz
- Motor current ripple frequency:
  - 32 kHz (3/10 amp models)
  - 16 kHZ (20/30/55 amp models)
- Input resolutions: 12 bit
- Long term speed regulation (0.01%)
- Velocity loop update rate 500 µs (2 kHZ)
- Commutation update rate 125 µs (8 kHz) (for smooth sinusoidal commutation)

Fault protection
- Output phase to phase short circuit protection
- Overvoltage
- Undervoltage
- Overtemperature (motor and amplifier)
- Overspeed
- Overcurrent
- Feedback loss
- Foldback

Environmental
- Operation range
  - Ambient 0 to 45°C (derated above ambient)
  - Storage -20°C to 70°C
- Humidity (non-condensing) 10% to 90%

Digital compensation
- PI, PDFF or Pole Placement selectable
- Factory preset or field tunable
- MOTIONLINK software provides tuning programming via RS-232 serial interface

Inputs
- +/-10 volt analog command with up to 16,000: 1 dynamic speed range
- RS-232 serial interface up to 19.2 Kb
- Remote enable
- Resolver or encoder/hall feedback for motor commutation
- CW and CCW end travel limit inputs
- Motor thermostat

Outputs
- Fault output
- Encoder equivalent

Operational modes
- Velocity control
- Torque control

Diagnostics
- Seven segment LED display
- Error history log
- Internal variable monitoring

Amplifier Ratings

Model	DC Bus Voltage Input (VDC)	Output Continuous Current Per Phase (RMS/phase)	Output Peak Current Per Phase (RMS/phase) (2 sec)	Output Continuous Power (kW)	Internal Power Dissipation (Watts)	PWM Switching Frequency (kHz)
SR03	110 to 360	3	6	1.1	37	16
SR06	110 to 360	6	12	2.2	84	16
SR10	110 to 360	10	20	3.6	120	16
SR20	125 to 360	20	40	7.3	240	8
SR30	255 to 360	30	60	11.0	254	8
SR55	255 to 360	55	110	20.0	465	8

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POWER SUPPLY SPECIFICATIONS

SERVOSTAR Power Supply Specifications and Sizing

Model	AC Line Input Voltage +/-10% (VAC)	Main Input Current Continuous Per Phase (RMS)	Main Input Current Peak Per Phase (RMS) 2 sec	Rated Input Power (kVA)	Rated Output Power (kW)	Standard Regen (Watts) Internal (External)	Internal Dissipation (Watts)
PA08	115 1Ø	8	16	0.9	0.65	Capacitive Only	50
	230 1Ø			1.8	1.3		
	230 3Ø			3.2	2.4		
PA28	230 1Ø	14	56	3.2	2.4	40W (400W)	100
	230 3Ø	28	56	11.2	8.4		
PA50	230 3Ø	50	100	20	15	None (500W or 1000W)	325
PA75	230 3Ø	75	150	29.9	22.5	None (500W to 2000W)	475

Protective features
- Soft start circuitry
- Overtemperature

Environmental
- Operating ambient temperature - 0 to 45°C (derated above ambient)
- Storage temperature -20° to 70°C
- Humidity (non-condensing) 10% to 90%

PA Series Power Supply Sizing

SERVOSTAR amplifiers perform as power converters generating three-phase sinewave current by pulse-width modulating a high-voltage DC bus.

PA Series power supplies produce DC bus, logic power for up to four SERVOSTAR amplifiers. The output power rating of the supply must exceed or equal the combined average power of all servo drives operating simultaneously. Average power of an individual servo drive is based on a power calculation of RMS torque and speed. The power supply output rating takes into account losses and power factor such that no further derating is needed with respect to the motor output power.

$$\text{Power (Watts)} = \frac{N(\text{RPM}) \times T(\text{lb-ft})}{7.04}$$

or

$$\text{Watts} = \frac{N(\text{RPM}) \times T(\text{N-m})}{9.55}$$

In addition to the power requirement, each power supply has a maximum axis configuration based on logic supply requirements of individual SERVOSTAR amplifiers. The PA08 has a logic supply rated for up to two SERVOSTAR amplifiers. All other power supplies can drive up to four axes of SERVOSTAR amplifiers (See Maximum Axis Configuration Chart). See application note E026 for more detail on power supply sizing.

Maximum Axis Configuration

Power Supply Model	Maximum Number of SERVOSTAR Amplifiers
PA08	2
PA28	4
PA50	4
PA75	4

Regeneration Sizing

Shunt regeneration is required to dissipate energy that is pumped back into the DC bus during load deceleration. The amount of shunt regeneration required is a function of the sum of simultaneously decelerating loads. The loads need to be defined in terms of system inertia, maximum speed, and deceleration time. In addition, the duty cycle must be known. Application Note E025 details a calculation method to determine proper regeneration sizing; call our literature department for a copy of this application note.

Transformer Sizing

PA Series power supplies can be connected to a line. Built-in soft-start circuitry protects power supply components and eliminates nuisance tripping of breakers or fuse blowing due to large in-rush currents. Transformers are only required for voltage matching purposes. In this case, the transformer should have a 115 or 230 VAC secondary depending on the operating voltage. The kVA rating of the transformer should take into account not only the servo output load requirements but also losses in the system and power factor. The transformer should have a kVA rating no less than the input kVA rating of the power supply if the full supply rating is being utilized.

If the full output power of the power supply is not needed, the following calculation can be used:

$$\text{KVA} = \frac{\text{Load Power (Watts)}}{.75\ (1000)}$$

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CONNECTOR INFORMATION

Bus Status Relay	
Pin #	Function
1	DC Bus OK
2	DC Bus OK

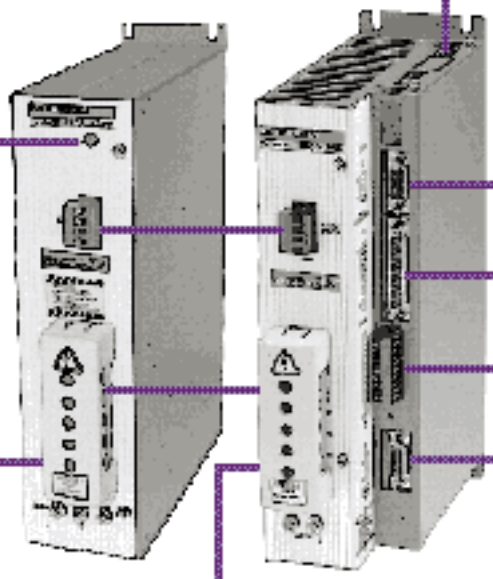
C1 Serial Communications	
Pin #	Function
1	Shield
2	Txd
3	Rxd
5	Enable Supply (VCC)

C7 Inter SERVOSTAR Communications

C2 Resolver Feedback (from Motor) used on SRxx Models (Standard)	
Pin #	Function
1	Sine Hi
2	Sine Lo
3	Shield
4	Cos Hi
5	Cos Lo
6	Shield
12	Shield
13	Motor Thermostat
14	Shield
15	Ref Hi
16	Ref Lo
25	Motor Thermostat

OR

C2 Encoder / Hall Feedback (from Motor) used on SExx Models (Optional)	
Pin #	Function
1	Ch A
2	$\overline{\text{Ch A}}$
3	Shield
4	Ch B
5	$\overline{\text{Ch B}}$
6	Shield
7	Common
8	Common
9	$\overline{\text{Hall 1}}$
10	$\overline{\text{Hall 2}}$
11	$\overline{\text{Hall 3}}$
12	Shield
13	Motor Thermostat
14	Shield
15	Marker
16	$\overline{\text{Marker}}$
17	Shield
19	+5 Volt Supply
20	+5 Volt Supply
21	Shield
22	Hall 1
23	Hall 2
24	Hall 3
25	Motor Thermostat



PA08 Power Supply

SR03 SERVOSTAR Amplifier

AC Power Input (Bus)	
Pin #	Function
La	Power (Phase A)
Lb	Power (Phase B)
Lc	Power (Phase C)

Motor (Power)	
Pin #	Function
Ma	Phase A
Mb	Phase B
Mc	Phase C

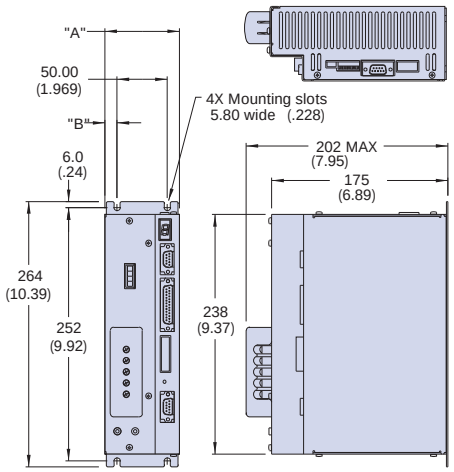
C4 Encoder Equivalent Output	
Pin #	Function
1	A
2	$\overline{\text{A}}$
3	Common
4	B
5	$\overline{\text{B}}$
6	Shield
7	I
8	$\overline{\text{I}}$
9	Shield

C3 User I/O	
Pin #	Function
1	Shield
2	Analog Command +
3	Analog Command -
4	Common
5	Fault Output
6	Fault Output
7	24 volt Input
8	Enable
9	CW Limit
10	CCW Limit

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DIMENSIONS

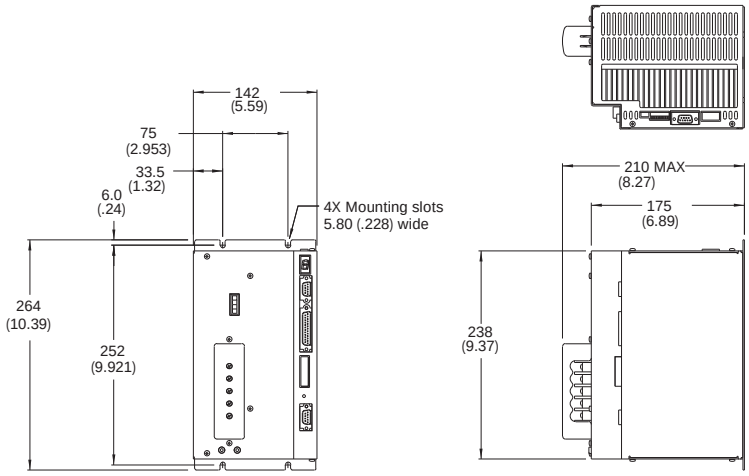
SR03/06/10/20 Amplifier



	A	B
SR03	2.91 (75)	0.49 (12.5)
SR06	2.91 (75)	0.49 (12.5)
SR10	3.54 (90)	0.79 (20)
SR20	4.67 (119)	1.35 (34.3)

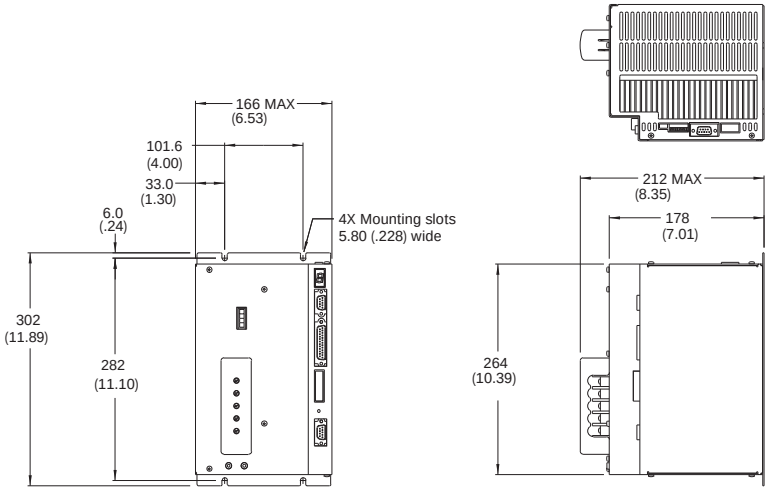
Dimensions in mm (inches)

SR30 Amplifier



Dimensions in mm (inches)

SR55 Amplifier

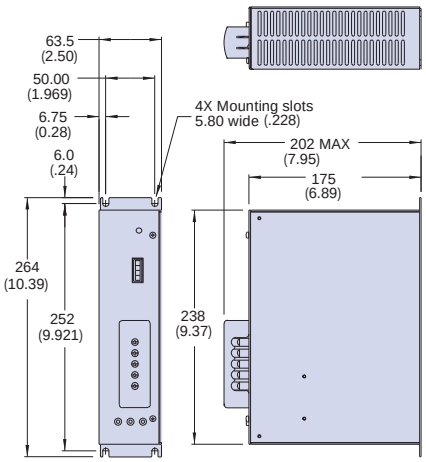


Dimensions in mm (inches)

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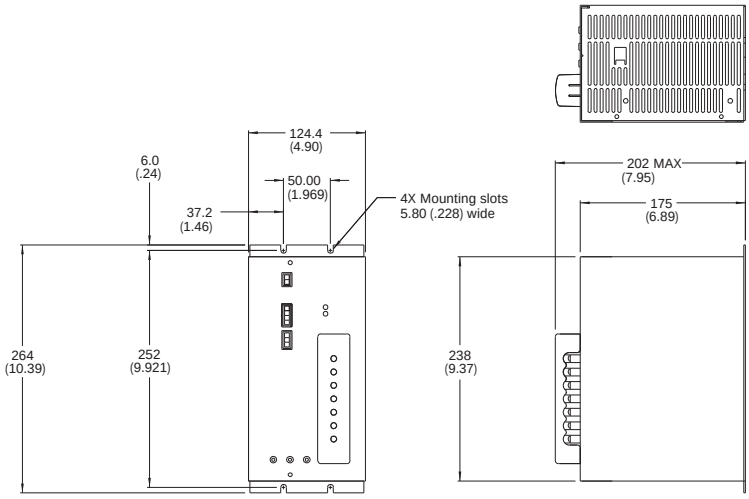
DIMENSIONS

PA08 Power Supply



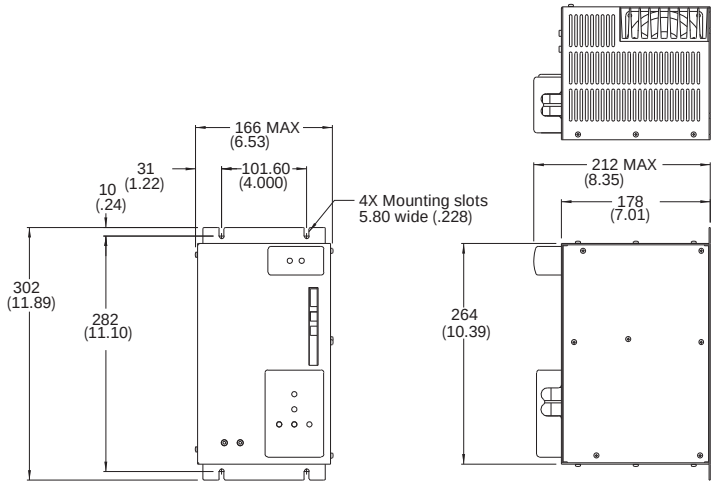
Dimensions in mm (inches)

PA28 Power Supply



Dimensions in mm (inches)

PA50/75 Power Supply

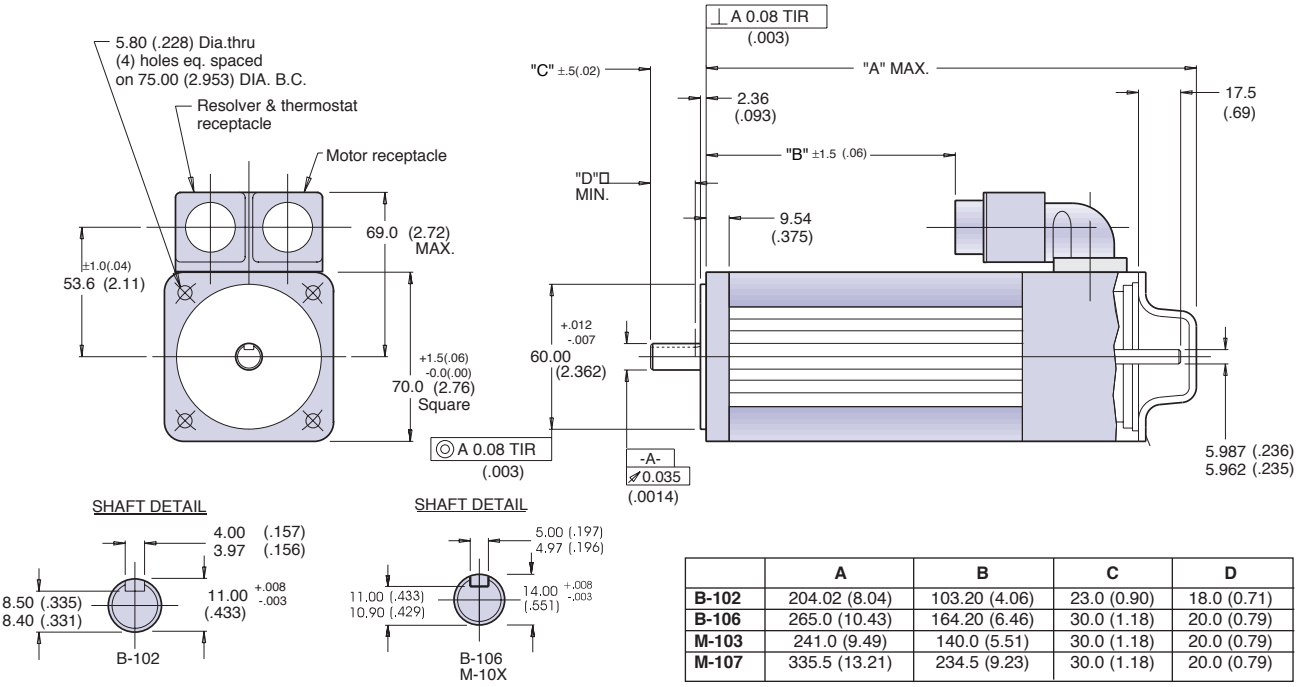


Dimensions in mm (inches)

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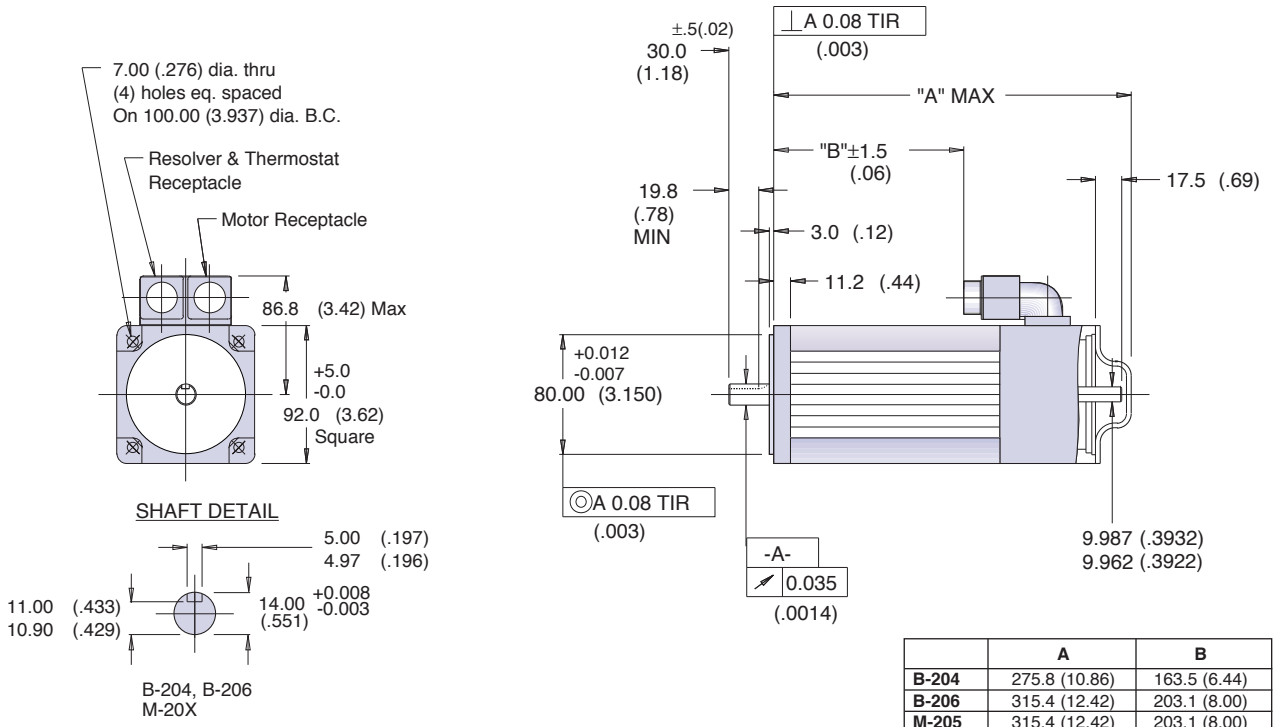
B, M-10X-X-21



	A	B	C	D
B-102	204.02 (8.04)	103.20 (4.06)	23.0 (0.90)	18.0 (0.71)
B-106	265.0 (10.43)	164.20 (6.46)	30.0 (1.18)	20.0 (0.79)
M-103	241.0 (9.49)	140.0 (5.51)	30.0 (1.18)	20.0 (0.79)
M-107	335.5 (13.21)	234.5 (9.23)	30.0 (1.18)	20.0 (0.79)

Dimensions in mm (inches)

B, M-20X-X-21



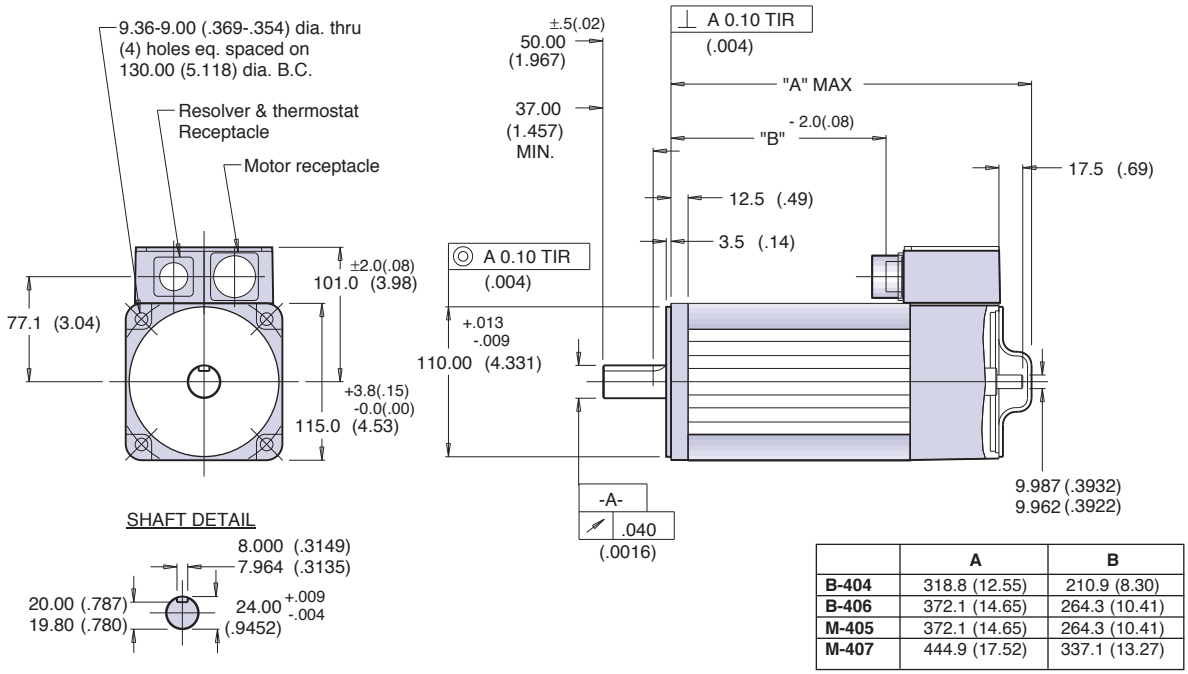
	A	B
B-204	275.8 (10.86)	163.5 (6.44)
B-206	315.4 (12.42)	203.1 (8.00)
M-205	315.4 (12.42)	203.1 (8.00)
M-207	373.2 (14.69)	260.5 (10.26)

Dimensions in mm (inches)

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DIMENSIONS

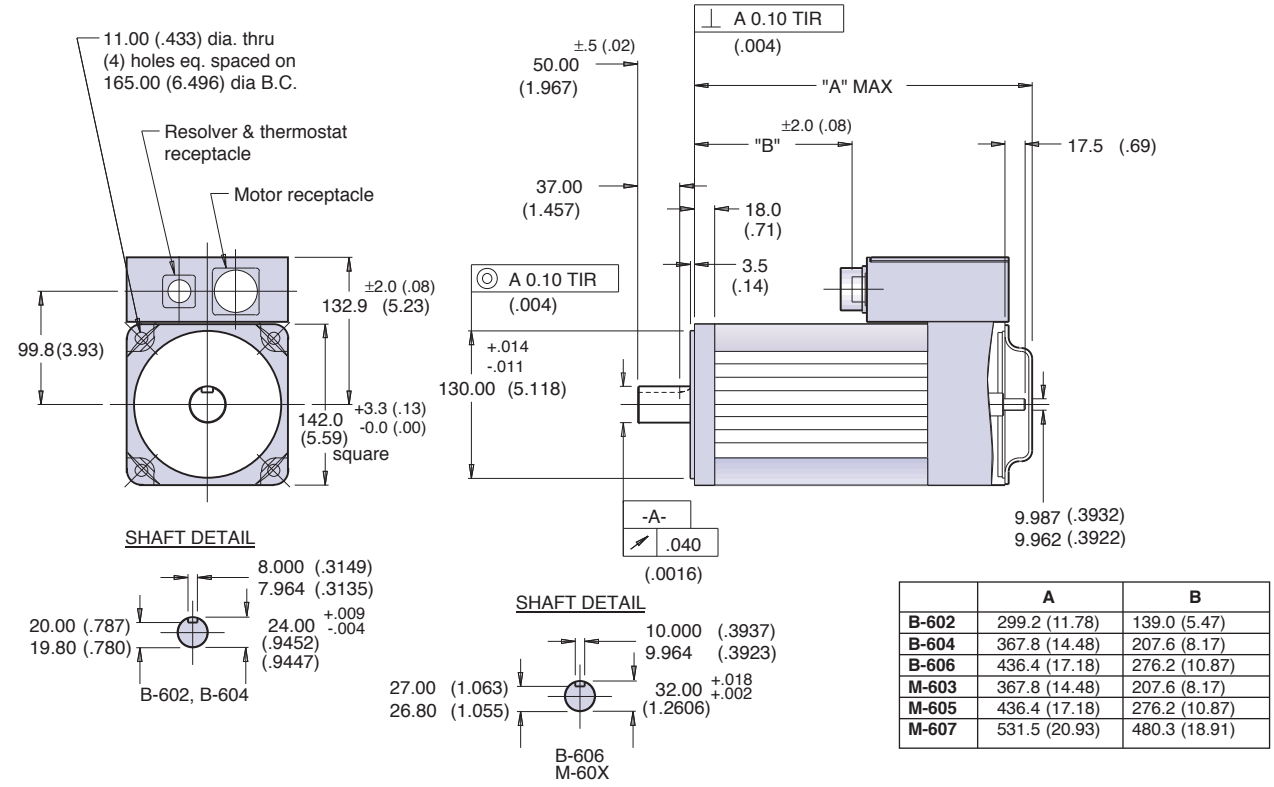
B, M-40X-X-21



	A	B
B-404	318.8 (12.55)	210.9 (8.30)
B-406	372.1 (14.65)	264.3 (10.41)
M-405	372.1 (14.65)	264.3 (10.41)
M-407	444.9 (17.52)	337.1 (13.27)

Dimensions in mm (inches)

B, M-60X-X-21



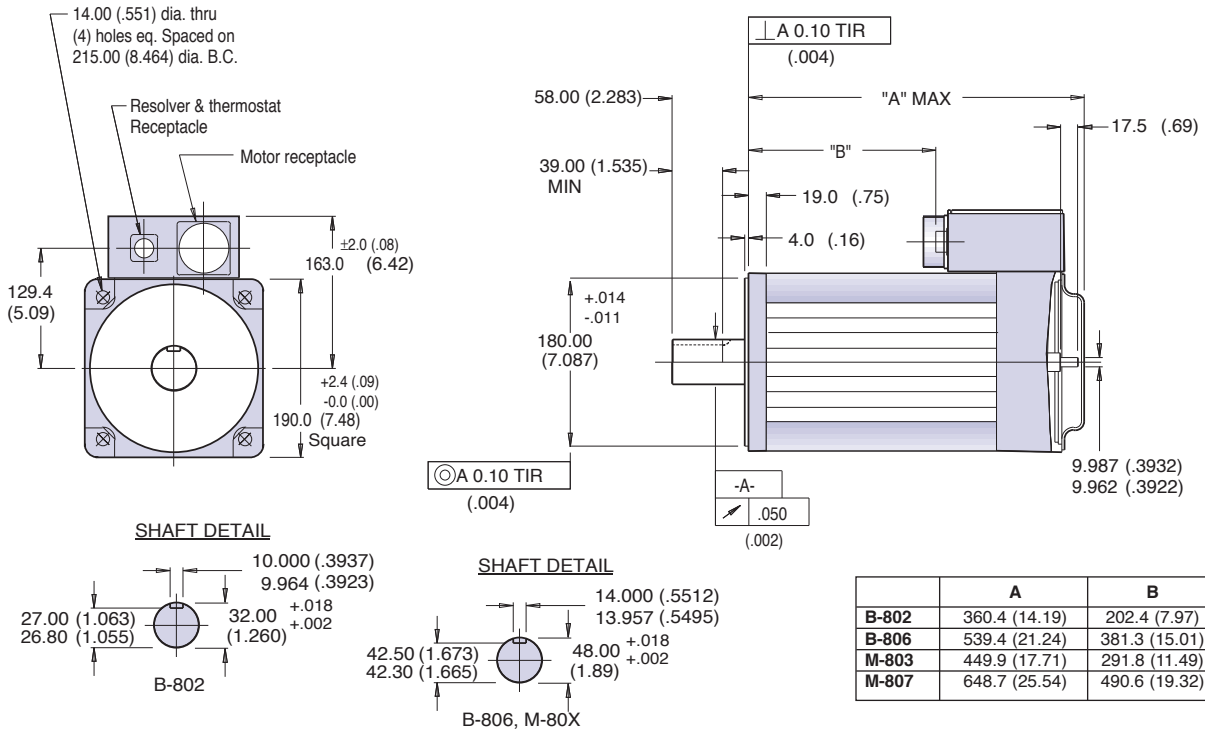
	A	B
B-602	299.2 (11.78)	139.0 (5.47)
B-604	367.8 (14.48)	207.6 (8.17)
B-606	436.4 (17.18)	276.2 (10.87)
M-603	367.8 (14.48)	207.6 (8.17)
M-605	436.4 (17.18)	276.2 (10.87)
M-607	531.5 (20.93)	480.3 (18.91)

Dimensions in mm (inches)

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DIMENSIONS

B, M-80X-X-21



	A	B
B-802	360.4 (14.19)	202.4 (7.97)
B-806	539.4 (21.24)	381.3 (15.01)
M-803	449.9 (17.71)	291.8 (11.49)
M-807	648.7 (25.54)	490.6 (19.32)

Dimensions in mm (inches)

Notes:
1. Motor can be mounted in any position.
2. Shaft seal has been certified to meet IP-65 sealing.
3. Pressure on shaft seal must not exceed 0.21 kg/cm^2
4. Motor protection thermostat opens upon temperature rise and should be connected into a latched (locked out) power down type circuit.

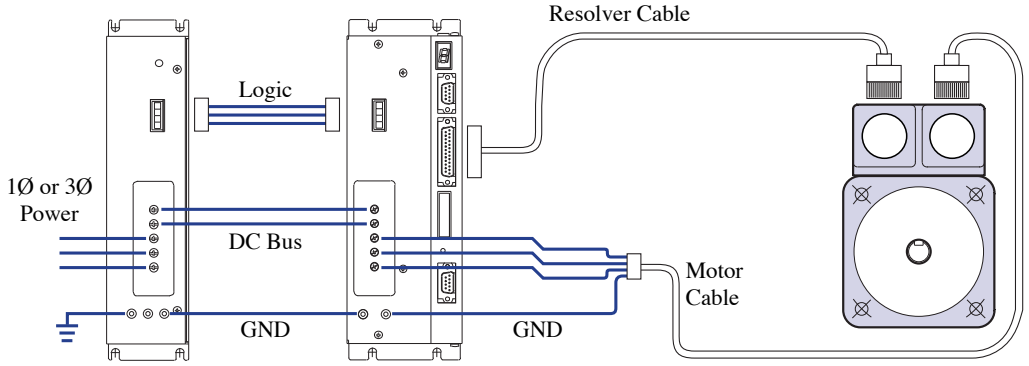
Connections:

Motor Receptacle
- Pin A - Phase A (brown)
- Pin B - Phase B (red)
- Pin C - Phase C (white)
- Pin D - Ground (green with yellow stripe)

Resolver Receptacle
- Pin A - S3 (black)
- Pin B - S1 (red)
- Pin C - S4 (blue)
- Pin D - S2 (yellow)
- Pin E - R1 (red/white)
- Pin F - R2 (yellow/white)

- Pin T, Pin U } Normally closed contacts 4 amp, 120 VAC - thermostat opens at 170°C +/- 5°C and closes at 132°C +/- 5°C

SYSTEM INTERCONNECT DIAGRAM



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SYSTEM ORDERING INFORMATION

SERVOSTAR/Kollmorgen GOLDLINE System Configurations

Amplifier	Motor	Cable Assembly	Curve Number
SR03000-2G102A	B-102-A-21	CS-SS-RGA12-xx	1
SR03000-2G103A	M-103-A-21	CS-SS-RGA12-xx	1
SR06000-2G106B	B-106-B-21	CS-SS-RGA12-xx	2
SR06000-2G107B	M-107-B-21	CS-SS-RGA12-xx	2
SR10000-2G204C	B-204-C-21	CS-SS-RGA12-xx	3
SR10000-2G205C	M-205-C-21	CS-SS-RGA12-xx	3
SR10000-2G206C	B-206-C-21	CS-SS-RGA12-xx	4
SR10000-2G207C	M-207-C-21	CS-SS-RGA12-xx	4
SR20000-2G404C	B-404-C-21	CS-SS-RGA23-xx	5
SR20000-2G405C	M-405-C-21	CS-SS-RGA23-xx	5
SR20000-2G406B	B-406-B-21	CS-SS-RGA23-xx	6
SR20000-2G407B	M-407-B-21	CS-SS-RGA23-xx	6
SR20000-2G602B	B-602-B-21	CS-SS-RGA24-xx	7
SR20000-2G603B	M-603-B-21	CS-SS-RGA24-xx	7
SR20000-2G604A	B-604-A-21	CS-SS-RGA24-xx	8
SR20000-2G605A	M-605-A-21	CS-SS-RGA24-xx	8
SR30000-2G606D	B-606-D-21	CS-SS-RGB44-xx	9
SR30000-2G607D	M-607-D-21	CS-SS-RGB44-xx	9
SR30000-2G802A	B-802-A-21	CS-SS-RGB45-xx	10
SR30000-2G803A	M-803-A-21	CS-SS-RGB45-xx	10
SR55000-2G806A	B-806-A-21	CS-SS-RGC45-xx	11
SR55000-2G807A	M-807-A-21	CS-SS-RGC45-xx	11

Note: SERVOSTAR amplifiers shown are compensated for 230 VAC (to PA power supply), bus voltage 325 VDC
xx designation is length in 3 meter increments, max resolver cable length is 75 meters, max encoder length is 30 meters

Power Supply:	PA0800	8 amp power supply
	PA2800	28 amp power supply
	PA5000	50 amp power supply
	PA7500	75 amp power supply
External Regen Resistor Kit:	ER-30	400 watts, for PA28 only
	ER-20	500 watts, for PA50 or PA75
	ER-21	1000 watts, for PA50 or PA75
	ER-22	1000 watts, for PA75
	ER-23	2000 watts, for PA75
Communications Cable:	B-93062-003	RS-232 communications cable: 3 meters
Connector Kit:	CK100	Mating connectors for C1, C2, C4, & C7

Note: SERVOSTAR amplifier and Kollmorgen GOLDLINE systems are available with encoder based feedback.
Screw terminal mating connectors C3 and C5 are included with the SERVOSTAR amplifier.
EP (explosion proof motors), custom mechanicals - special shafts, keyways, mounting, and connectors are available.
Contact your local regional sales office for more information.

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