

Motion Solutions

2004 Product Catalog

Motion Controllers

Servo Amplifiers

Servo Motors

Stepping Amplifiers
and Motors

Motion Software



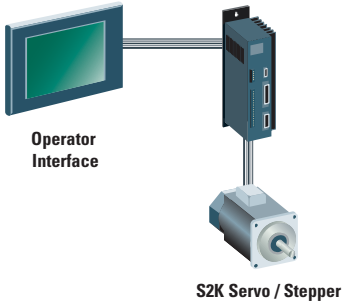
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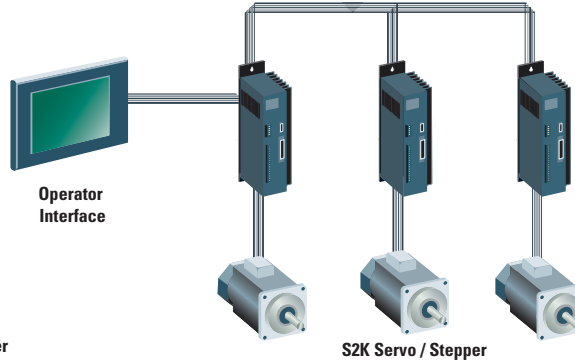
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Motion Controllers

SINGLE AXIS



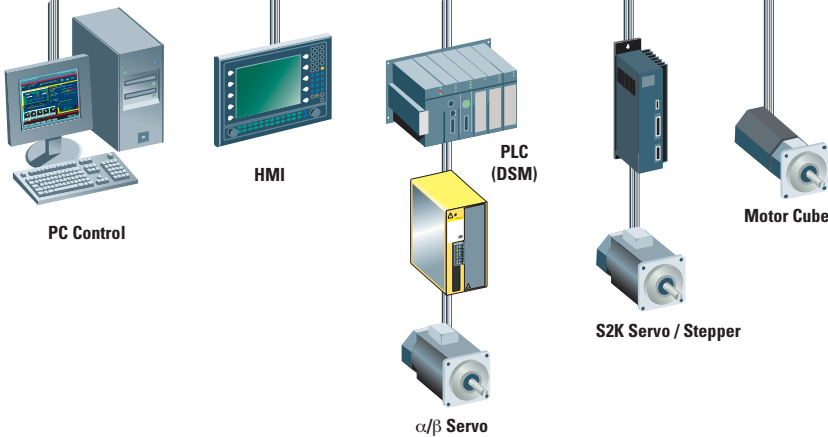
MULTI-AXIS



Stand-Alone Motion Control

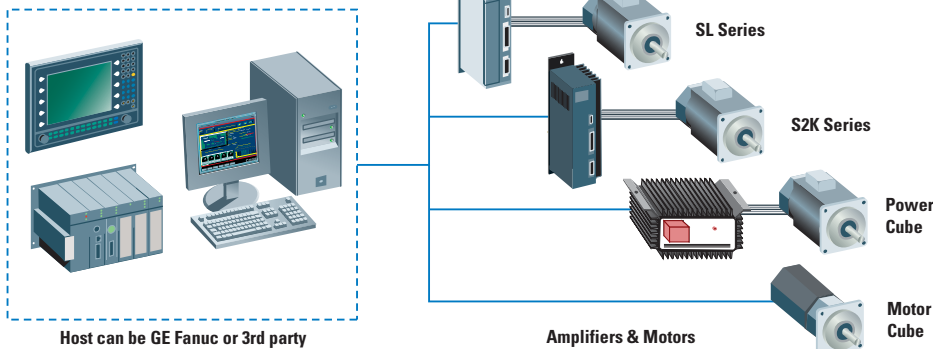
With 21 local I/O points per drive/controller (expandable via network), your S2K stand-alone motion system becomes a cost-effective machine control for many applications. DeviceNet peer-to-peer allows a single drive/control to easily control motion in a multi-axis system.

Network



Distributed Motion Control

As a network node, your GE Fanuc motion system can receive commands and programs as well as handshake data with PCs, PLCs etc. This provides the flexibility to choose your front-end control and HMI solutions while still receiving the best-in-class motion control. PLC, stand-alone and smart motor solutions are available.



Third Party Solutions

If you have your own controller and require only servo/stepping motors and drives, GE Fanuc is your source. Maintain your existing control architecture while taking advantage of motors/drives with a wide torque range, superior performance and unparalleled reliability.

Motion Controllers

GE Fanuc offers motion controllers for a broad range of applications and system configurations. The DSM300 series are servo motion controller modules for GE Fanuc PACSystems™ RX3i and Series 90-30 PLCs. The DSM300 Series can control FANUC digital servos or analog servos. The S2K series are stand-alone controllers available for brushless servo and stepping motor control and include an integral AC power supply and servo amplifier. Regardless of your requirements, GE Fanuc has a motion controller to meet your requirements, from simple to complex machine control.



GE Fanuc Motion Controller Feature Comparison

Feature	DSM300	S2K
Architecture	PLC-based	Stand-alone
Number of Axes	Up to 4 (Digital) or 4 (Analog)	1
Servo Command Interface	Fiberoptic/GEF Digital/Analog Velocity/Analog Torque	n/a
Position Feedback Type	Serial Encoder/Quadrature Encoder	Resolver/Serial Encoder
Programming	Via PLC or PC	Via PC
Local Logic Program	Yes	Yes
Motion Program		
Program Memory	15K	60K
Number of Programs (Max.)	11 (40 sub)	4 (32 sub)
Motion Types		
Incremental Moves	Yes	Yes
Absolute Moves	Yes	Yes
Interpolation	No	No
Synchronized (Block) Start	Yes	n/a
Jogging	Yes	Yes
Home	Yes	Yes
Acc/Dec	Linear/Jerk	Linear/Jerk
Cam	Yes	Yes
Follower (Gearing)	Yes	Yes
Pulse-based	No	Yes

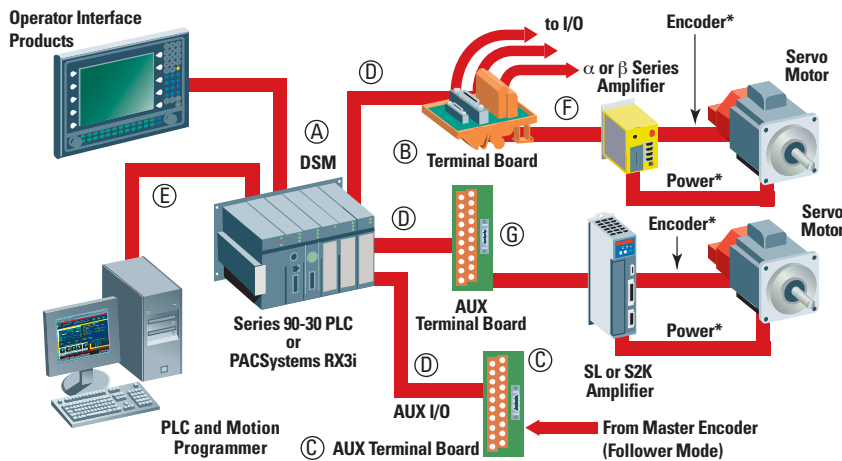
DSM300 for Series 90-30 and PACSystems RX3i

DSM302/DSM314

The DSM300 Series is a family of motion controllers for GE Fanuc Series 90-30 and PACSystems RX3i PLC controllers. The DSM302 is a versatile two-axis motion controller that works with either the digital α and β Series Servos or with any servo with an analog command interface. In addition, the DSM314 can control up to 4 servos with an analog velocity or torque command interface. The DSM302 or DSM314 is applicable in a broad range of single and multiaxis applications. By combining the versatility of the GE Fanuc PLCs and GE Fanuc operator interface products with GE Fanuc servos, DSM302/314 provides customers with a complete solution, from the motor to the operator interface. This single-source system results in such benefits as ease of integration and programming, shorter development cycles, and higher reliability.



DSM302/314 Series



*See servo amplifier section for motor cable information.

	Part Number	Description
A	Modules	IC693DSM302 DSM302 Motion Controller (2 axis)
		IC693DSM314 DSM314 Motion Controller (4 analog/2 digital axes) for Series 90-30
		IC694DSM314 DSM314 Motion Controller (4analog/2 digital axes) for RX3i
B	Terminal Boards	IC693ACC335 Digital Servo Axis Terminal Board (one per axis)
		IC693ACC336 Analog Servo Axis Terminal Board (one per axis)
C		Auxiliary Terminal Board (for follower applications)
D	Command Cables	IC693CBL324 Terminal Board Connection Cable - 1m (one per axis)
		IC693CBL325 Terminal Board Connection Cable - 3m (one per axis)
E	Communication Cables	IC693CBL316 Station Manager Serial Cable (one per motion system)
F	Digital Servo Cables	IC800CBL001 Servo Command Cable - 1m (one per axis)
		IC800CBL002 Servo Command Cable - 3m (one per axis)
G	Analog Servo Cables	IC800SKFLYxxx S2K interface cables xxx=010 (1m), xxx=030 (3m)
		IC800SLCI2xxx SL 30-750W Amplifier Cable
		IC800SLCIVxxx SL 1-5 kW Amplifier Cable

PLC Requirements

PLC Requirements: Machine Edition Logic Developer PLC will support the DSM. Multiple DSM boards can be placed in PLC main, expansion, and remote racks. The use of DSM modules is limited by the power supply capacity and the number of words of %AI data supported by the selected CPU. Each axis of control requires a minimum of 40 words of %AI data and a maximum of 64 words (84 for 4 axis DSM314) of %AI data depending on the mode selected. DSM314 requires a CPU with Release 10 or higher Firmware.

Features

- Powerful processor with digital signal - co-processor (DSP) provides a separate control loop processor that operates independently of PLC scan rates for fast servo loop updates
- Enhanced tracking accuracy with velocity feed-forward control and high-resolution feedback
- On-board I/O for travel limits, servo enable, home switch and position capture
- Flash firmware available from our website makes upgrades a snap
- In digital servo mode, all positioning, velocity and torque loops are closed in the controller. For properly sized drives, little or no servo tuning is required once the motor type code has been set
- Also works in analog mode with any quadrature encoder-based servo to provide a low-cost, high-performance servo system
- DSM314 Local Logic Engine handles high speed logic decisions synchronous with motion update
- Cam & Electronic Gearing Modes

APPLICATIONS

- High-speed conveyor lines
- Assembly machines
- Pick and place gantries
- Textile machines
- Coil/spool winding
- Adhesive applicators

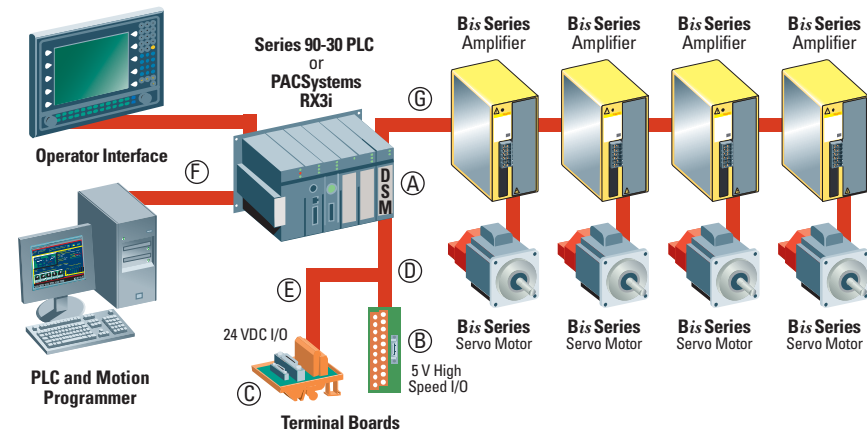
Motion Controllers

DSM324i

The DSM324i can control up to 4 axes of Beta *i* Series Servos via a fiberoptic command interface for superior noise immunity. By combining the versatility of the GE Fanuc PLCs and GE Fanuc operator interface products with GE Fanuc servos, DSM324i provides customers with a complete solution. This single-source system results in such benefits as ease of integration and programming, shorter development cycles, and higher reliability.



DSM324i



*See servo amplifier section for motor cable information.

	Part Number	Description
A Motion Controller	IC693DSM324	DSM324i Motion Controller for Series 90-30
	IC694DSM324	DSM324i Motion Controller for PACSystems RX3i
B Terminal Boards	IC693ACC336	DSM324i 5V High Speed & Analog I/O Terminal Board (1 per module)
C	44A726268-001	DSM324i 24V I/O Terminal Board (1 per module)
D Interface Cables	IC693CBL324	ACC336 Terminal Board Interface Cable - 1m (1 per axis)
	IC693CBL325	ACC336 Terminal Board Interface Cable - 3m (1 per axis)
E	IC693CBL311	DSM324i to 44A726268-001 Terminal Board Cable - 3m (1 per module)
	IC693CBL319	DSM324i to 44A726268-001 Terminal Board Cable - 1m (1 per module)
F Communication Cables	IC693CBL316	Serial Cable for Programming (1 per system)
G Fiber Optic Command Cables	A66L-6001-0023#L150R0	FSSB Cable 0.15 Meter
	A66L-6001-0023#L1R003	FSSB Cable 1 Meter
	A66L-6001-0023#L3R003	FSSB Cable 3 Meter
	A66L-6001-0026#L1R003	FSSB Cable Sheathed, 1 Meter
	A66L-6001-0026#L5R003	FSSB Cable Sheathed, 5 Meter
	A66L-6001-0026#L10R03	FSSB Cable Sheathed, 10 Meter
	A66L-6001-0026#L20R03	FSSB Cable Sheathed, 20 Meter

PLC Requirements

PLC Requirements: Machine Edition Logic Developer PLC will support the DSM. Multiple DSM boards can be placed in PLC main, expansion, and remote racks. The use of DSM modules is limited by the power supply capacity and the number of words of %AI data supported by the selected CPU. Each axis of control requires a minimum of 40 words of %AI data and a maximum of 84 words of %AI data depending on the mode selected. DSM324i requires a Series 90-30 CPU with Release 10 or higher Firmware or an RX3i CPU with Release 2.8 or higher Firmware.

Features

- Distributed architecture for greater machine flexibility—up to 100 meters between axes
- Improved product accuracy with velocity feed-forward control and high-resolution feedback
- On-board Analog and Digital I/O (travel limits, home switch and high speed position capture)
- Flash firmware available from our website makes upgrades a snap
- Easy-to-use; all positioning, velocity and torque loops are closed in the controller. For properly sized drives, little or no servo tuning is required once the motor type code has been set
- DSM324i Local Logic Engine handles high speed logic decisions synchronous with motion update
- Cam & Electronic Gearing Modes for your more complex applications

APPLICATIONS

- High-speed conveyor lines
- Assembly machines
- Pick and place gantries
- Textile machines
- Coil/spool winding
- Adhesive applicators

Motion Controllers

Feature Comparison

General	DSM302		DSM314		DSM324i Series	
	Standard	Follower	Standard	Follower	Standard	Follower
Number of Digital Servo Axes	2	2	2	2	4	4
Number of Analog Servo Axes	2	2	4	4	n/a	n/a
Analog Servo Command Types	Velocity	Velocity	Torque/Velocity	Torque/Velocity	n/a	n/a
Position Error Integrator	Yes	Yes	Yes	Yes	Yes	Yes
Position Capture Inputs/Axis	2 @ 5 V	2 @ 5 V	2 @ 5 V	2 @ 5 V	2 @ 5 V	2 @ 5 V
Position Capture Response	250µs	250µs	+/- 2 count plus 10µs	+/- 2 count plus 10µs	+/- 2 count plus 10µs	+/- 2 count plus 10µs

Feedback

Position Feedback Options:						
Digital Servo Axis	GE Fanuc Serial Encoder	GE Fanuc Serial Encoder	GE Fanuc Serial Encoder	GE Fanuc Serial Encoder	GE Fanuc Serial Encoder	GE Fanuc Serial Encoder
Analog Servo Axis	Quadrature Encoder	Quadrature Encoder	Quadrature Encoder	Quadrature Encoder	n/a	n/a
Position Resolution (counts):						
Digital Servo Axis	8K /32K	8K/32K	8K/32K	8K/32K		
Analog Servo Axis	Based on encoder	Based on encoder	Based on encoder	Based on encoder	n/a	n/a
Positioning Range (linear mode)	±8,388,607	±8,388,607	±536,870,911	±536,870,911		
Master Feedback	n/a	Quadrature Encoder	n/a	Quadrature Encoder	n/a	Quadrature Encoder
Master Feedback Max Frequency	n/a	1MHz	n/a	1MHz	n/a	1MHz

Motion Features

Positioning	Absolute Incremental	Absolute Incremental	Absolute Incremental	Absolute Incremental	Absolute Incremental	Absolute Incremental
Acceleration Types	Linear Jerk Limited	Linear Jerk Limited	Linear Jerk Limited	Linear Jerk Limited	Linear Jerk Limited	Linear Jerk Limited
Motion Types	Linear/Continuous	Continuous	Linear/Continuous	Continuous	Linear/Continuous	Continuous
Follower Modes	n/a	Velocity/Position/Winder	n/a	Velocity/Position	n/a	Velocity/Position
Cam Support	n/a	n/a	Yes	Yes	Yes	Yes
Local Logic Program	n/a	n/a	Yes	Yes	Yes	Yes

PLC I/O References*

%I	64	64	32/48/64/80	32/48/64/80	32/48/64/80	32/48/64/80
%Q	64	64	32/48/64/80	32/48/64/80	32/48/64/80	32/48/64/80
%AI	40/50/64	50/64	24/44/64/84	24/44/64/84	24/44/64/84	24/44/64/84
%AQ	6/9/12	9/12	3/6/9/12	3/6/9/12	3/6/9/12	3/6/9/12

*DSM314 and DSM324i I/O References are based on the number of configured axes. Table date shown is for 1/2/3/4 axes.

Hardware Features

I/O System	DSM302/304	DSM324i	Description
I/O Connectors	4 x 36 pin	1 x 36 pin; 1 x 24 pin	
Analog Output	4	2	12 bit resolution plus sign; ±10 VDC; 5mA max.
Analog Inputs (Analog Axes only)	8	2	15 bit resolution plus sign; ±10 VDC
SNP Comm Port	1 RJ11	1 RJ11	RS232 - SNP Protocol

Motion Controllers

S2K Series

Stand-Alone, Digital Amplifier and Controller for Servo and Stepping Motors

The GE Fanuc S2K Series products offer amplifier and motion control capability for brushless servo and stepping motor systems in a stand-alone integrated package. The S2K Series incorporate all-digital amplifier technology and fast servo update rates for enhanced performance. Advanced features such as electronic gearing and camming are supported. The DeviceNet implementation includes the ODVA defined position controller master/slave protocol as well as peer-to-peer control for multi-axis stand-alone systems. Models are also available with a Profibus DP-Slave implementation as well.



Features

- Resolver or serial encoder feedback options
- Two module types available: brushless servo amplifier with integrated motion controller or stepping amplifier with integrated motion controller
- Wide torque range: servo systems from 0.84-477 lb-in (0.09-53.9 Nm) continuous, steppers from 144-3074 oz-in (1-21.7 Nm). Standard features include all-digital, self-tuning servo amplifier and 50,000 microstepping amplifier
- 14 I/O points with DeviceNet or Profibus options or 21 I/O points (4.3 and 7.2 amp models only) when no network option is specified
- Full complement of diagnostic information provided via on-board, two-character LED or over network or serial communication options
- Includes point-to-point moves, jogging and advanced functions such as electronic gearing/camming and pulse based motion. The command set includes full logic, subroutines, variables and math functions in addition to I/O and network control.
- A multi-tasking operating system supports a broad range of application complexity...from simple to advanced program requirements
- Small, self-contained package conserves valuable panel space
- All quick-disconnect terminations for fast installation and change-over
- UL, cUL, and CE certifications

APPLICATIONS

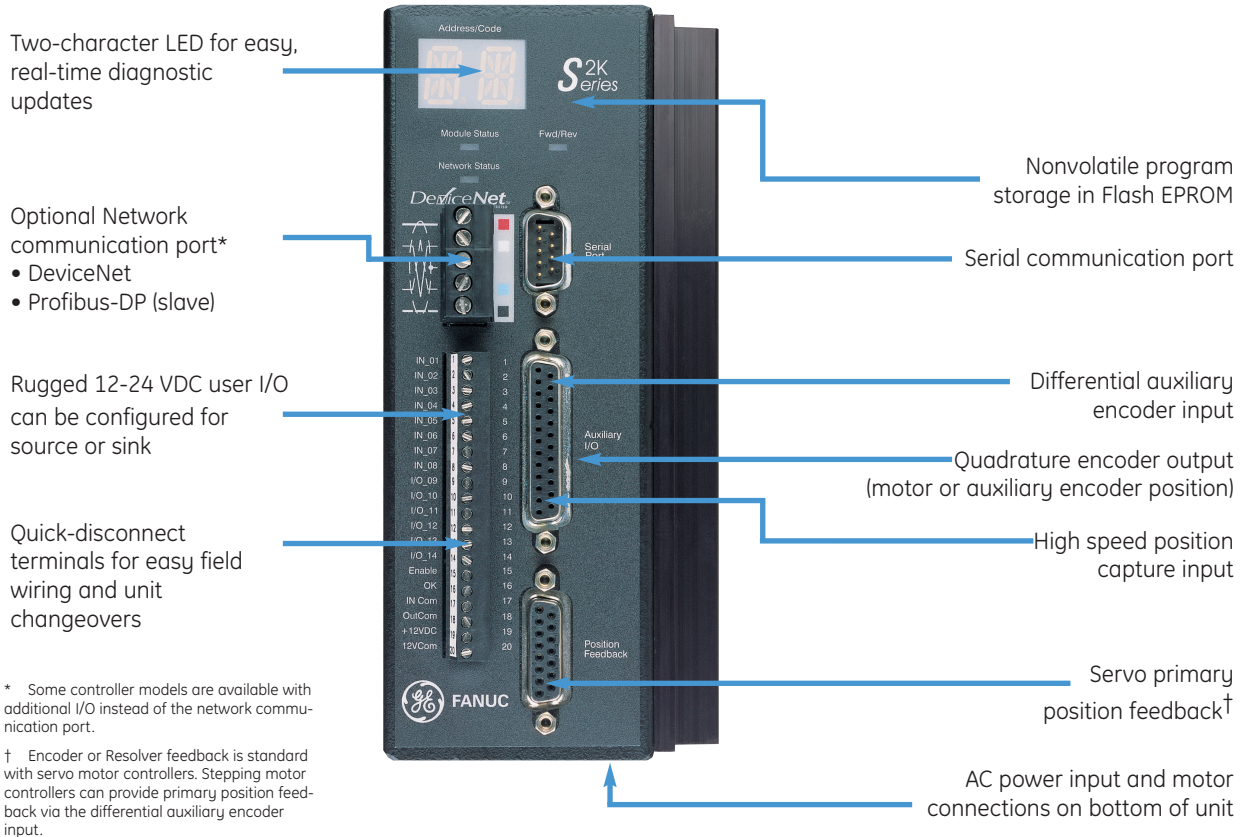
- Packaging machines
- Labeling machines
- Bag making machines
- Assembly
- Pick and place
- Flying cutoff
- Rotary tables
- Feed/cut to length
- Electronic line shafting
- Sorting conveyors
- and many more

Motion Controllers

S2K Series

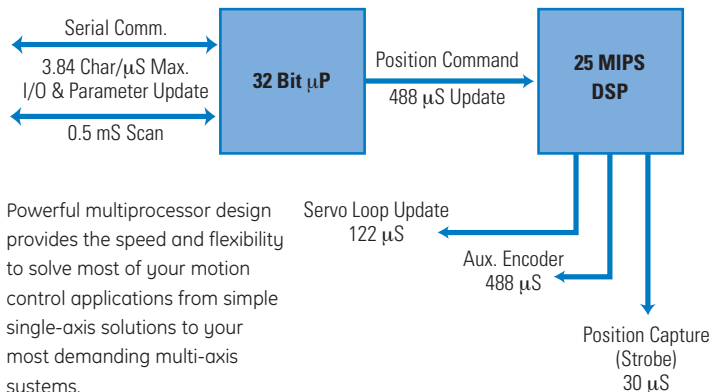
Single-Axis Controller Features

- Dynamic torque limiting
- Complex motion profiles including jerk limited acceleration
- Electronic gearing and camming
- Index and phase synchronization
- High speed registration/position capture for feed/cut to mark applications
- Secondary position feedback for compensation of slip and lost motion
- User configurable digital and analog I/O
- Powerful programming environment



Dual Processor Architecture

Single-Axis Controllers



Motion Controllers

S2K Series Electrical Specifications

Power Specification

Specifications	Units	SSI105	SSI104	SSI107	SSI216	SSI228	SSI407	SSI420
AC Input Voltage Range	VAC	90-130, 1 phase	90-250, 1 or 3 phase		180-250, 3 phase		324-528, 3 phase	
AC Input Frequency Range	Hz	50-440						
PWM Frequency to Motor	kHz	16.4						8.2
Min. Motor Inductance	mH	n/a	1 (per phase)					
Cont. Output Current	A _{rms}	5/phase	4.3	7.2	16	28	7.2	20
Peak Output Current	A _{rms}	5/phase	8.6	14.4	32	56	10.8	20
Max. Input Current 1-phase	A _{rms}	10	7	15	n/a	n/a	n/a	n/a
3-phase	A _{rms}	n/a	4	8	18	30	8	22
Max. Input Power	KVA @ Rated VAC	1.3	1.6	3.8	8.5	14.3	6.4	18
Logic Input Power	VAC	n/a	n/a	90-250 @ 0.5 A			+18-30 VDC @ 1.5 A	
DC Power Outputs	VDC	+5 @ 0.25 A; +12 @ 0.5 A						

Digital Inputs and Outputs

Operating Range	12-24 VDC, 30 VDC maximum	
Interface Format	optically isolated, source/sink user-configurable	
Inputs	Number Available*	14 or 21 (max)
	Maximum Off Voltage	4 VDC
	Minimum On Voltage	10 VDC
	Load	2 kΩ
Outputs	Number Available*	6 or 10 (max)
	Maximum On Resistance	35 Ω
	Maximum Load Current	100 mA
	Maximum Off Leakage Current	200 nA

*Larger numbers available on models without a network port. Six of the I/O can be configured as either inputs or outputs.

Analog Inputs and Outputs

Operating Range	±10 VDC
Resolution	12 Bits (input)/8 Bits (output)
Input Impedance	50 kΩ
Output Current	5 mA
Number Available	2 Analog Inputs; 1 Analog Output

Auxiliary Encoder Input

Input Format	single-ended or differential; sine or square wave; quadrature, pulse/direction or cw/ccw pulse
Input Voltage Range	+5 to +15 VDC
Line Count Frequency	3 MHz maximum
Pulse Frequency	12 MHz maximum with 4X multiplier

Motor Serial Encoder Input (S-Series Motors only)

Input Format	quadrature encoder with serial commutation channel
Resolution	10,000 quadrature pulses per revolution
Input Voltage Range	+5 to +15 VDC
Line Count Frequency	2 MHz maximum
Pulse Frequency	8 MHz maximum with 4X multiplier

Motor Resolver Feedback Input (Resolver-based models only)

Number Available	1
Resolution	4096 pulses per revolution
Maximum Speed	15,000 RPM
Type	Control Transmitter
Phase Shift	± 5.0 degrees @ 5kHz
Null Voltage	< 20 mV @ 5 kHz
Transformation Ratio	0.5

Serial Communication

Available Ports	1
Functions Supported	multi-purpose programming port
Format	RS-232*
Maximum Addressable Units	1
Communication Rate	1200, 9600, 19200 or 38400 baud
Maximum Distance from Host to Unit	50 feet
Flow Control	XON / XOFF

*Plug-on RS-422/485 serial converter available. See ordering information.

Motion Controllers

S2K Series

Communication Specifications	DeviceNet	Profibus® DP Slave
Number Available	1 port per unit	1 port per unit
Functions Supported	I/O slave messaging, position controller profile, and explicit peer-to-peer messaging	Profibus profile, multicast, broadcast
Number of Nodes	64 maximum	100 maximum
Input Power Requirements	11-25 VDC @ 40 mA maximum	none
Communication Rate	125, 250 or 500 KBaud	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000 Kbaud
Length of Drop Line	20 feet maximum	
Length of Trunk Line	thin cable	328 feet maximum
	thick cable	328 feet maximum @ 500 KBaud
		820 feet maximum @ 250 Kbaud
		1,640 feet maximum @ 125 Kbaud
		3936 feet @ 9.6 Kbaud

Environmental Specifications

Operating Temperature, Free Air Ambient*	
SSI104, SSI105, SSI107	32 to 122°F (0 to 50°C)
SSI216, SSI228, SSI407, SSI420	32 to 104°F (0 to 40°C)
Storage and Shipping Temperature	-40 to 176°F (-40 to 80°C)
Relative Humidity	5 to 95% noncondensing
Enclosure Type	open
Altitude**	3300 feet (1000 m)

* Assumes heatsink in vertical orientation.

** Operation at higher altitudes require controller derating. Please consult GE Fanuc.

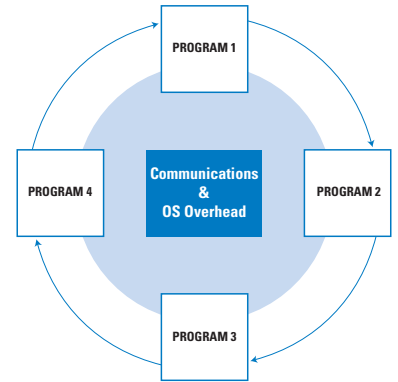
S2K Series

Operating System

At the heart of the S2K Series controller is a powerful multi-tasking real-time operating system and comprehensive programming language. Up to four programs, one motion task and one communication task can be simultaneously executed. Time critical tasks can be executed in a separate program, and Program 4 acts as a fault handler that automatically executes

on power-up or when a fault occurs. S2K controllers also support immediate mode operation where an external host can load registers or issue commands (over the serial or Network ports) that are executed in real time. This is a powerful feature for applications where program variables are determined on-the-fly based on process input and external events.

S2K Series Operating System



- Four user defined programs scheduled sequentially (round robin)
- Program 4 executes on power-up or when a fault occurs
- Any program can start/stop any other program
- All programs can utilize common motion blocks

Software Capabilities

The S2K Series integrated controller models allow up to 100 predefined motion blocks and four user defined programs. Programs and motion blocks are defined using Proficy™-Motion Developer Machine Edition, a powerful Microsoft Windows®-based utility that provides the resources to give users total application program

management. The comprehensive programming language provides extensive math and logical operators, program flow control, I/O manipulation, network control and system status commands. Configuration and programming wizards simplify integration and reduce engineering time.

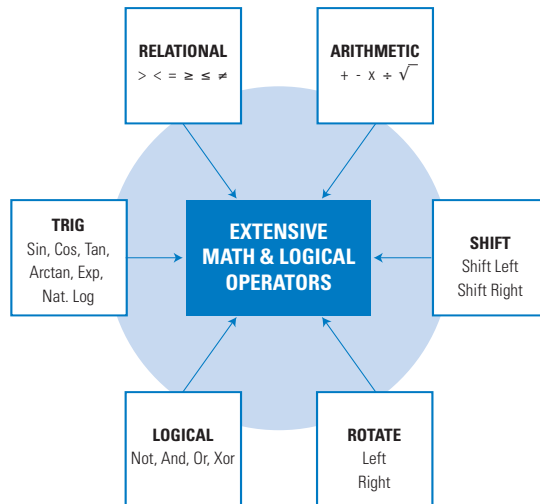
Application Programming

Resources	S2K Controller
Flow control	
Labels per program	999
Nested GOSUBS per program	32
Variables	
Boolean	256
Floating point *, †	2,048
Integer *	4,096
String	144
Programs	
General purpose	3
Fault-handling	1
Countdown timers	8
Motion blocks	100
Concurrent task execution	6 maximum‡
Master axes per program	1
Flash EPROM Memory	
User programs & Cam tables	60 Kbytes
Variable	42 Kbytes

* Integer and floating point variable memory space is shared; numbers are maximum for each but not for both concurrently. Floating point variables require twice the memory of integer variables. Thus, for example, if 1,000 floating point variables are used, 2,096 integer variables are possible.

† Floating point variables use a 32-bit mantissa and are precise to 9 decimal digits.

‡ 4 programs, 1 motion block, 1 communication port.



Motion Controllers

S2K Series

Programming Language

The Generation D programming language consists of registers, commands and variables. Users familiar with the product will find the mnemonic form easy to use. Programs and motion blocks are developed using the registers and commands in the following list. A variety of flow control commands, conditional operators and subroutines allow simple or complex application program development.

Registers

Reg/Command	Class	Description	Reg/Command	Class	Description
!	Program	exits terminal window line editor	CCB	Motion	cam compile begin point
?	Diagnostic	reports value of register to the terminal window	CCE	Motion	cam compile end point
p1, p2	Operand	floating point operands	CCM	Motion	compiles cam motion
"p1", \$p2	Operand	string operands	CCP	Motion	cam compile start position
+	Operator	concatenate strings p1 and p2	CE	System	conversion error
+, -, *, /, **	Operator	arithmetic operators	CHANGEPW	System	prompts for password change
>, >=, =, <, <=, <	Operator	relational operators	CHR	Operator	converts ASCII character code to its associated character
16#p3	Operand	base 16 integer operand	CIE	System	computer interface format enable
2#p2	Operand	base 2 integer operand	CLL	Input/Output	clears line and positions cursor at beginning of line
ABS	Operator	absolute value of any floating point or integer operand	CLM	System	clears user memory; resets registers to defaults
ADDN	System	address of network port	CLS	Input/Output	clears display and positions cursor at home
ADDR	System	RTU port address	CMD	Axis	position controller command output
AI	Input/Output	analog input	CMO	Axis	commutation angle offset
AIB	Input/Output	analog input deadband	CMR	Axis	motor poles to resolver poles commutation ratio
AIN	Input/Output	network analog input	CNC	System	close network connection
AIO	Input/Output	analog input offset	COS	Operator	cosine trigonometric function of a floating point operand
AND	Operator	logical AND of two operands of the same type	CR	Input/Output	positions cursor at beginning of next line down
AO	Input/Output	analog output	CRH	Input/Output	positions cursor at home
AON	Input/Output	network analog output	CRM	Input/Output	remembers cursor position
AOP	Input/Output	power-up state of analog output	CRP	Input/Output	positions cursor
ASC	Operator	converts 1st character in string operand to ASCII code	CRR	Input/Output	positions cursor at remembered position
ATN	Operator	arctangent trigonometric function	CURC	Axis	continuous current
AUTORET	System	enables auto retrieving of user memory	CURCN	Axis	network continuous current
AUTOTUNE	System	automatically sets up control constants	CURP	Axis	peak current
BAUD	System	baud rate of serial port	CURS	Axis	power save current
BAUDN	System	data rate of network port	CURSN	Axis	network power save current
BIT	System	data bits of serial port	DEL	Operator	deletes characters from a string operand
BS	Input/Output	backspaces cursor	DEL	Program	deletes current statement in the terminal window line editor
CAE	Motion	cam enable	DGC	Diagnostic	loads diagnostic condition for printing
CAF	Motion	cam filter constant	DGE	Diagnostic	enables diagnostics
CAI	Motion	cam position register increment	DGI	Diagnostic	load diagnostic item to print
CAM	Motion	cam point	DGL	Diagnostic	prints diagnostic line of items
CAO	Motion	cam offset	DGO	Diagnostic	outputs diagnostic register value to serial port
CAP	Motion	cam shaft position	DGP	Diagnostic	prints diagnostic message to serial port
CAR	Motion	cam position register	DGS	Diagnostic	sets program to single step mode
CAS	Motion	cam scale factor	DGT	Diagnostic	sets program to trace mode
CAT	Motion	cam shaft position type			
CAZ	Motion	zeros cam table			

* Indicates registers that cannot be set in a program

Motion Solutions

Motion Controllers

S2K Series

Reg/Cmd	Class	Description	Reg/Cmd	Class	Description
DI	Input/Output	digital input	HSE	System	enables XON, XOFF handshake protocol for serial port
DIN	Input/Output	network digital input	HT	Motion	halts motion
DINA	Input/Output	network digital input register assignment	HTN	Motion	network halt
DIR*	Axis	direction of motor for forward moves	HWE	Motion	handwheel input enable
DIRN*	Axis	network direction of motor for forward moves	IF...GOSUB	Program	conditionally branches to specified subroutine label
DIRX	Axis	direction of auxiliary position	IF...GOTO	Program	conditionally branches to specified label
DIRXN	Axis	network direction of auxiliary position	IF...THEN	Program	conditionally executes next command in program
DIT	Input/Output	digital input filter time	IN	Input/Output	inputs register value from key buffer
DO	Input/Output	digital output	INS	Operator	inserts characters into a string operand
DOE	Input/Output	fault on digital output fault enable	IO	Input/Output	general I/O
DON	Input/Output	network digital output	IP	System	axis in position
DONA	Input/Output	network digital output register assignment	IPB	Axis	in-position band
DSE	System	display format enable	IPN	System	network in position
EG	Input/Output	positive-edge-sensitive digital input	ITB	Operator	converts integer operand to a binary string
EKB	Input/Output	empties key buffer	ITF	Operator	converts integer operand to a floating point number
END	Program	ends program or motion block and exits editor	ITH	Operator	converts integer operand to a hexadecimal string
EOT	Axis	encoder output type	ITS	Operator	converts integer operand to a string
EXM	Program	executes motion block	KA	Axis	acceleration feedforward
EXP(p1)	Operator	takes exponential of a floating point operand	KD	Axis	derivative control gain
EXP	Program	executes program	KEY	System	character in key buffer
EXVS	Program	executes command stored in string variable	KI	Axis	integral control gain
FALSE	Operand	Boolean operator equivalent to OFF or a logical 0	KL	Axis	motor inductance
FAULT	Program	enters editor at faulting statement	KLALL	Program	kills all programs
FC	System	fault code	KLP	Program	kills program
FCN	System	network fault code	KM	Axis	motor number (stepper only)
FCNN	System	network device fault code	KP	Axis	proportional control gain
FE	Axis	axis following error	KSN	Axis	network stall velocity threshold
FEB	Axis	following error bound	KSSN	Axis	network stall sensitivity
FI	System	fault input register	KT	Axis	filter time constant
FIN	Operator	find string p1 in string operand p2	KVN	Axis	network bus voltage
FIRMWARE	System	downloads firmware and saves in nonvolatile memory	KY	Input/Output	puts character into key buffer
FR	Axis	axis feedback resolution	KYA*	Input/Output	key assignment
FRC	Axis	axis feedback resolution for commutation	L	Program	makes last statement the current statement in line editor
FTI	Operator	converts floating point operand to an integer by rounding	LABEL	Program	makes statement at label the current statement in line editor
FTS	Operator	converts floating point operand to a string	LED	Input/Output	state of display LED
FUNCTION	Input/Output	goes to label associated with key pressed	LEN	Operator	computes the length of a string operand
GET	Input/Output	gets one character from key buffer	LFT	Operator	selects leftmost characters of a string
GOSUB	Program	unconditionally branches to specified subroutine label	LGN	Operator	takes natural log of any floating point operand
GOTO	Program	unconditionally branches to specified label	LOCK	Program	locks interpreter to program
GRB	Motion	gearing bound	LWR	Operator	converts string operand to lower case
GRD	Motion	gearing denominator	MAC	Motion	motion acceleration/deceleration
GRE	Motion	gearing enable	MACN	Motion	network motion acceleration/deceleration
GRF	Motion	gearing filter constant	MAP	Motion	motion acceleration/deceleration percentage
GRN	Motion	gearing numerator			

* Indicates registers that cannot be set in a program

Motion Controllers

S2K Series

Reg/Cmd	Class	Description	Reg/Cmd	Class	Description
MB	System	motion block executing	PFC	Axis	position feedback correction numerator
MDC	Motion	motion deceleration	PFD	Axis	position feedback denominator
MDCN	Motion	network motion deceleration	PFE*	Axis	position feedback enable
MDP	Motion	motion deceleration percentage	PFL	Axis	position feedback backlash
MEMORY	System	reports memory remaining	PFN	Axis	position feedback numerator
MFA	Motion	motion feedrate acceleration/deceleration	PFT	Axis	position feedback correction time
MFD	Motion	motion feedrate deceleration	PHB	Motion	phase error bound
MFP	Motion	motion feedrate percentage	PHE	Motion	phase-locked loop enable
MID	Operator	selects middle characters of a string operand	PHG	Motion	phase gain
MJK	Motion	motion jerk percentage	PHL	Motion	phase length
MOTION	Program	edits motion block	PHM	Motion	phase multiplier
MOTORSET	System	automatically sets up motor constants	PHO	Motion	phase offset
MPA	Motion	absolute move position	PHP	Motion	phase position
MPI	Motion	incremental move position	PHR	Motion	phase error
MPL	Motion	move pulses	PHT	Motion	phase lockout time
MPN	Motion	network move position	PHZ	Motion	phase zero
MPO	Motion	offset move position	PIPN	System	network profile in progress
MPS	Motion	motion pulse start position	PLA*	Axis	axis position length
MT	Motion	motion type	PLX*	Axis	auxiliary position length
MTM	Motion	move time	POE	Axis	power output stage enable
MVL	Motion	motion velocity	POP	Program	pops "gosub" address from top of "gosub" stack
MVLN	Motion	network motion velocity	PROG	System	program executing
MVM	Motion	motion velocity for run to marker	PROGRAM	Program	edits program
MVP	Motion	motion velocity of pulse move	PSA	Axis	axis actual position
NCO	System	network connection open	PSAN	Axis	network axis actual position
NET	System	network connection available	PSC	Axis	command position
NOT	Operator	logical NOT operation of any Boolean or integer operand	PSCN	Axis	network command position
OFA	Axis	axis position offset	PSO	Axis	offset position
OFF	Operand	Boolean operator equivalent to FALSE or a logical 0	PSR	Axis	resolver position
OFX	Axis	auxiliary position offset	PSX	Axis	auxiliary position
ON	Operand	Boolean operator equivalent to TRUE or a logical 1	PUT	Input/Output	puts one character to serial port
OR	Operator	logical OR operation of two operand of the same type	PWE*	Axis	position register wrap enable
OTE	Axis	hardware overtravel enable	PZA	Axis	axis position synchronized
OTF	Axis	forward software overtravel	PZX	Axis	auxiliary position synchronized
OTR	Axis	reverse software overtravel	Q	Diagnostic	reports value of register
OUSN	Input/Output	output command to network port with status	QTX*	Axis	auxiliary quadrature type
OUT	Input/Output	outputs string expression to serial port	RDN	Motion	network run direction flag
OUTN	Input/Output	output command to network port	REM	Program	remark
OUTS	Input/Output	outputs screen to display	REPEAT	Program	repeats motion from start of motion block
PAR	System	parity of serial port	RETRIEVE	System	retrieves user memory
PASSWORD	System	prompts for password	RETURN	Program	returns from subroutine
PCA	Axis	axis position capture	REVISION	Diagnostic	reports firmware revision
PCX	Axis	auxiliary position capture	REVN	Diagnostic	network device revision
PFB	Axis	position feedback deadband	RGT	Operator	selects rightmost characters of a string operand
			RHF	Motion	runs forward to home input
			RHR	Motion	runs reverse to home input
			RIN	Motion	network run incremental flag

* Indicates registers that cannot be set in a program

Motion Solutions

Motion Controllers

S2K Series

Reg/Cmd	Class	Description	Reg/Cmd	Class	Description
RMF	Motion	runs forward to marker	STI	Operator	converts a string operand to an integer
RMN	Motion	network run mode	STM	System	start time of timer
RMR	Motion	runs reverse to marker	STN	Motion	network stop
ROF	Motion	runs forward to overtravel input	STVB...GOTO	Program	set Boolean variable and if variable wasn't set, GOTO label
ROL	Operator	rotates bits of an integer operand left by n number of places	SUP	Program	suspends motion
ROR	Motion	runs reverse to overtravel input	SVL	Input/Output	saves screen lines
ROR	Operator	rotates bits of an integer operand right by n number of places (see ROL for operator description)	SVV	System	saves variables from RAM to nonvolatile memory
RPA	Motion	runs to absolute position	TAN	Operator	tangent trigonometric function of a floating point operand
RPI	Motion	runs to incremental position	TL	System	axis at torque limit
RPN	Motion	run profile of network device	TLC	Axis	torque limit current
RPO	Motion	runs to offset position	TLE	Axis	torque limit enable
RSF	System	resets faults	TM	System	timer timed out flag
RSFN	System	reset network faults	TMR	System	timer
RSM	Program	resumes motion	TRC	Operator	convert a floating point operand to an integer by truncation
RSTSTK	Program	resets "gosub" stack to empty	TRUE	Operand	Boolean operator equivalent to ON or a logical 1
RTU	System	Remote terminal unit mode enable	UNLOCK	Program	unlocks interpreter from program
RTUF	System	Remote terminal unit communication flag	UPR	Operator	converts a string operand to upper case
RTV	System	retrieves variables from nonvolatile memory to RAM	UPS	Input/Output	update screen
RVF	Motion	runs to velocity forward	URA*	Axis	axis unit ratio numerator
RVR	Motion	runs to velocity reverse	URB*	Axis	axis unit ratio denominator
SAVE	System	saves user memory	URX*	Axis	auxiliary unit ratio
SCAN	System	maximum scan time	VB	Variable	Boolean variable
SCRD	Input/Output	screen data	VBN	Variable	network Boolean variable
SCRL	Input/Output	screen line	VF	Variable	floating point variable
SCRP	Input/Output	screen position of data	VFA*	System	floating point variable allocation
SECURE	System	secures user memory	VFN	Variable	network floating point variable
SHL	Operator	arithmetic shift of integer operand of n places to the left	VI	Variable	integer variable
SHR	Operator	arithmetic shift of integer operand of n places to the right	VIN	Variable	network integer variable
SIN	Operator	sine trigonometric function of a floating point operand	VLA	Axis	axis velocity
SNI	Input/Output	scanned network input	VLAN	Axis	network axis velocity
SNIA	Input/Output	scanned network input address	VLAT	Axis	axis velocity filter time constant
SQR	Operator	takes square root of positive integer or floating point operand	VLX	Axis	auxiliary velocity
SRA	System	axis status	VLXT	Axis	auxiliary velocity filter time constant
SRP	System	program status	VS	Variable	string variable
SRS	System	system status	VSN	Variable	network string variable
ST	Motion	stops motion	WAIT	Program	waits for expression to be true
STEP	Motion	step input	WAIT_WHEN...GOTO	Program	waits for expression to be true or when expression becomes true goes to label
STF(p1)	Operator	converts a string operand to a floating point number	X	Program	steps through program/motion block
STF	System	sets fault	XOR	Operator	logical XOR function of two operands of the same type
STFN	System	network sets fault			

* Indicates registers that cannot be set in a program

Motion Controllers

S2K Series

Controller Diagnostics

The S2K Series products include a 2-character LED on the front panel for real-time diagnostic updates. The information is displayed in an easy-to-remember, mnemonic format. Multiple faults are displayed on a round robin basis. The diagnostic information is listed in the following table:

LED Status Display Codes

Display Code	Status	Description
OK	okay	Drive enabled, CPUs and operating system functional
CC	faulted	Motor regeneration circuit over current
DT	faulted	Controller over temperature
EC	faulted	Motor regeneration circuit excessive duty cycle
EI	faulted	Excessive command increment
FE	faulted	Excess following error
FL	faulted	Feedback Lost (servo only)
LE	faulted	Lost enable
MT	faulted	Motor over temperature (servo only)
OC	faulted	Motor over current (servo only)
OV	faulted	Motor over voltage
PF	faulted	Power failure
PO	faulted	Position register overflow
SF	faulted	Software fault
UV	faulted	Motor under voltage
0-63	ok/faulted	DeviceNet node address/fault code
•	ok/faulted	Flashing decimal indicates serial communication traffic

Multiple codes are alternately displayed in sequential order.

Hardware Resources	S2K Controller
Master axes	1
Auxiliary encoder input	1
Digital inputs	8† or 11‡
Digital inputs/outputs	6† or 10‡
Analog inputs	2
Analog outputs	1
Serial ports	1
Network connection	1
Servo motor torque range	0.84 to 477 lb-in (0.09-53.9 Nm)
Stepping motor torque range	94-780 oz-in (0.67-5.51 Nm)

† 14 total digital I/O lines are available on models with a network; 8 lines are inputs; 6 lines can be configured as inputs or outputs

‡ On units with additional I/O instead of network port, 21 total digital I/O lines are available; 11 lines are inputs; 10 lines can be configured as inputs or outputs

Hardware Capabilities

The S2K Series servo and stepping controllers provide a complete set of standard hardware resources.

Most on-board I/O can be configured by the user for application specific usage. An auxiliary encoder input can be used as a master input for electronic gearing/camming functions or for axis position feedback from an encoder mounted at the load.

In addition to the standard RS-232 serial port, machine designers may choose either the DeviceNet network option, Profibus-DP Slave network option or additional digital I/O to suit their application needs.

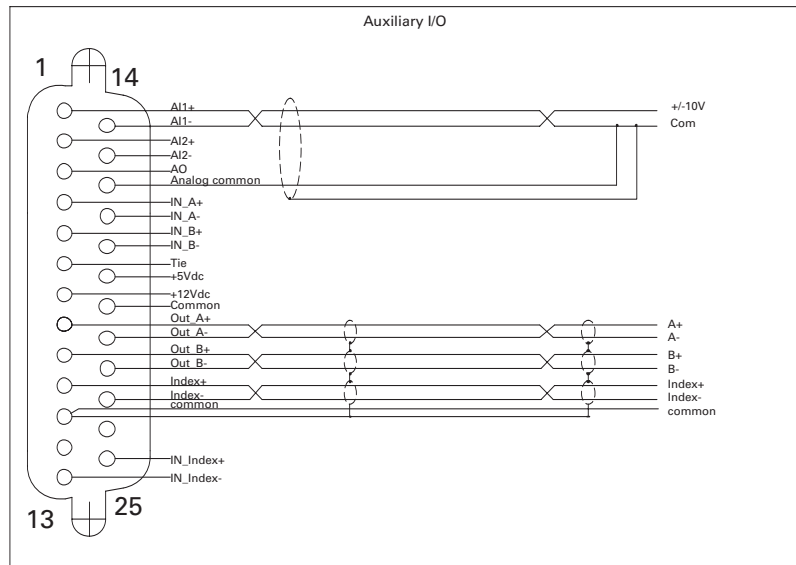
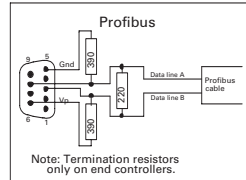
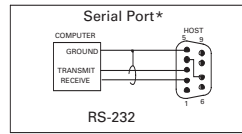
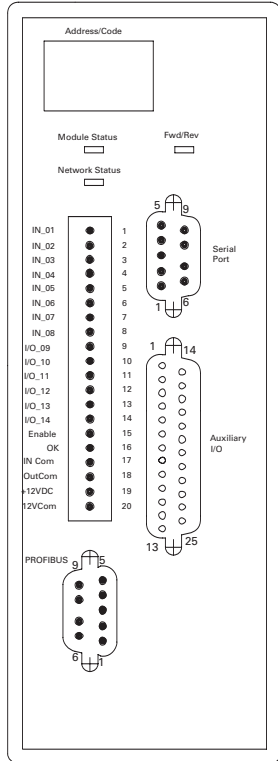
The S2K Series can control a wide torque range within a single model. The reduced package size and the extensive processing power provides motion control solutions for your most demanding applications.

S2K Series

User Control Connections

S2K Model: STI105 (Profibus Communication)

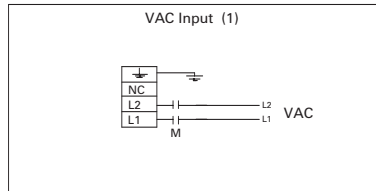
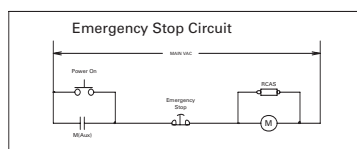
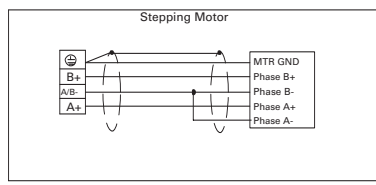
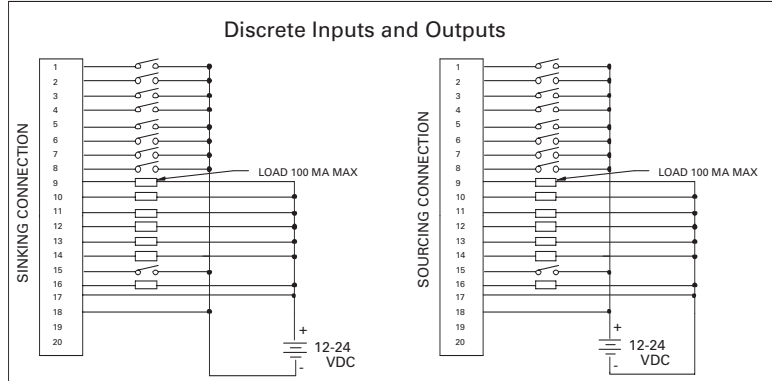
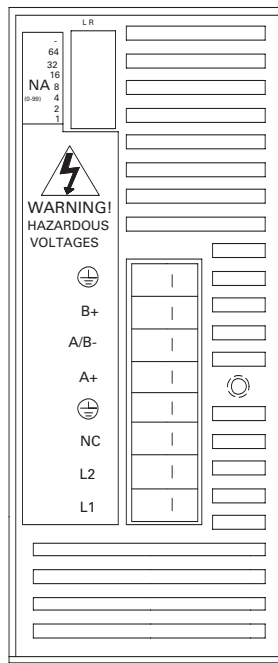
IC800STI105P2



DIP Switch Positions (2)

Profibus Address	1	2	4	8	16	32
(NA) 0	64	R	R	R	R	R
1	65	L	R	R	R	R
2	66	R	L	R	R	R
3	67	L	L	R	R	R
4	68	R	R	L	R	R
5	69	L	R	L	R	R
6	70	R	L	L	R	R
7	71	L	L	L	R	R
8	72	R	R	R	L	R
9	73	L	R	L	L	R
10	74	R	L	L	L	R
11	75	L	L	L	L	R
12	76	R	R	L	L	R
13	77	L	R	L	L	R
14	78	R	L	L	L	R
15	79	L	L	L	L	R
16	80	R	R	L	L	R
17	81	L	R	L	L	R
18	82	R	L	L	L	R
19	83	L	L	L	L	R
20	84	R	R	L	L	R
21	85	L	R	L	L	R
22	86	R	L	L	L	R
23	87	L	L	L	L	R
24	88	R	R	L	L	R
25	89	L	R	L	L	R
26	90	R	L	L	L	R
27	91	L	L	L	L	R
28	92	R	R	L	L	R
29	93	L	R	L	L	R
30	94	R	L	L	L	R
31	95	L	L	L	L	R
32	96	R	R	L	L	R
33	97	L	R	L	L	R
34	98	R	L	L	L	R
35	99	L	L	L	L	R
36	-	R	R	L	L	R
37	-	L	R	L	L	R
38	-	R	L	L	L	R
39	-	L	L	L	L	R
40	-	R	R	L	L	R
41	-	L	R	L	L	R
42	-	R	L	L	L	R
43	-	L	L	L	L	R
44	-	R	R	L	L	R
45	-	L	R	L	L	R
46	-	R	L	L	L	R
47	-	L	L	L	L	R
48	-	R	R	L	L	R
49	-	L	R	L	L	R
50	-	R	L	L	L	R
51	-	L	L	L	L	R
52	-	R	L	L	L	R
53	-	L	L	L	L	R
54	-	R	L	L	L	R
55	-	L	L	L	L	R
56	-	R	R	L	L	R
57	-	L	R	L	L	R
58	-	R	L	L	L	R
59	-	L	L	L	L	R
60	-	R	L	L	L	R
61	-	L	L	L	L	R
62	-	R	R	L	L	R
63	-	L	L	L	L	R

Profibus address 0-63 R X
64-99 L X



REMARKS:

- (1) Input power 90 to 130 VAC, 50-440 Hz
1 phase @ 10 Amps.
- (2) Must turn off power before changing settings.
R= right (closed)
L= left (open)

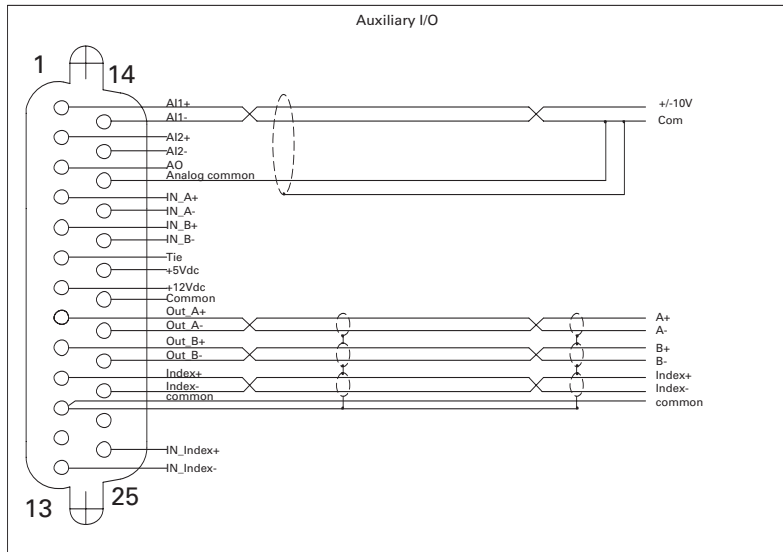
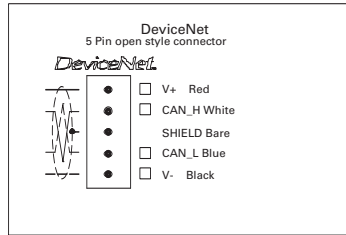
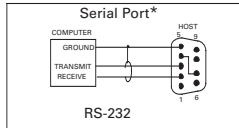
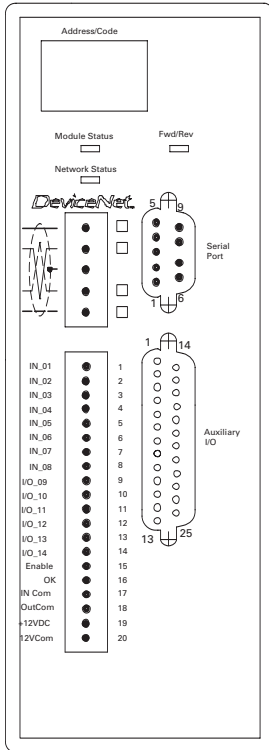
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Model: STI105 (DeviceNet Communication)

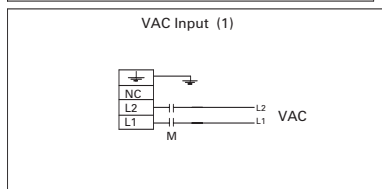
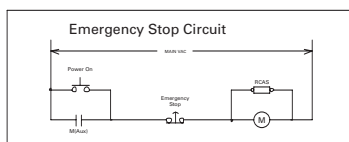
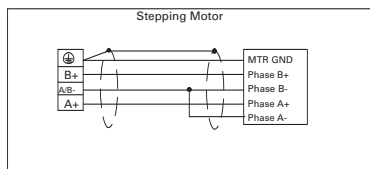
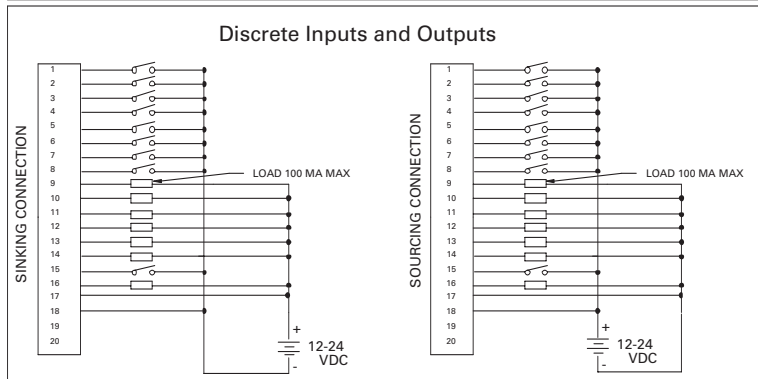
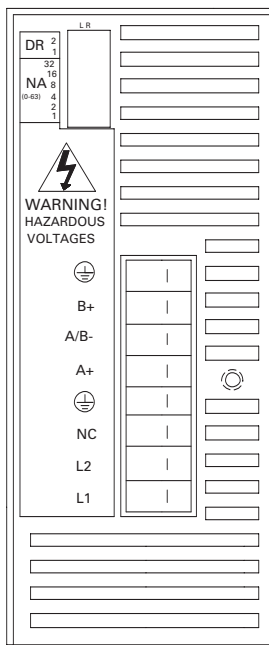
IC800STI105D2



DIP Switch Positions (2)

Device Net Address	1	2	4	8	16	32
(NA)	0	R	R	R	R	R
	1	L	R	R	R	R
	2	R	L	R	R	R
	3	L	L	R	R	R
	4	R	L	L	R	R
	5	L	L	L	R	R
	6	R	L	L	L	R
	7	L	L	L	L	R
	8	R	R	L	L	R
	9	L	R	L	L	R
	10	R	L	L	L	R
	11	L	L	L	L	R
	12	R	R	L	L	R
	13	L	L	L	L	R
	14	R	L	L	L	R
	15	L	L	L	L	R
	16	R	R	L	L	R
	17	L	R	L	L	R
	18	R	L	L	L	R
	19	L	L	L	L	R
	20	R	R	L	L	R
	21	L	L	L	L	R
	22	R	L	L	L	R
	23	L	L	L	L	R
	24	R	R	L	L	R
	25	L	L	L	L	R
	26	R	L	L	L	R
	27	L	L	L	L	R
	28	R	R	L	L	R
	29	L	L	L	L	R
	30	R	L	L	L	R
	31	L	L	L	L	R
	32	R	R	L	L	R
	33	L	L	L	L	R
	34	R	L	L	L	R
	35	L	L	L	L	R
	36	R	R	L	L	R
	37	L	L	L	L	R
	38	R	L	L	L	R
	39	L	L	L	L	R
	40	R	R	L	L	R
	41	L	L	L	L	R
	42	R	L	L	L	R
	43	L	L	L	L	R
	44	R	L	L	L	R
	45	L	L	L	L	R
	46	R	L	L	L	R
	47	L	L	L	L	R
	48	R	R	L	L	R
	49	L	L	L	L	R
	50	R	L	L	L	R
	51	L	L	L	L	R
	52	R	R	L	L	R
	53	L	L	L	L	R
	54	R	L	L	L	R
	55	L	L	L	L	R
	56	R	R	L	L	R
	57	L	L	L	L	R
	58	R	L	L	L	R
	59	L	L	L	L	R
	60	R	R	L	L	R
	61	L	L	L	L	R
	62	R	L	L	L	R
	63	L	L	L	L	R

Device Net Baud Rate	1	2
(DR)	125K	RR
	250K	LR
	500K	RL
	N/A	LL



REMARKS:

(1) Input power 90 to 130 VAC, 50-440 Hz
1 phase @ 10 Amps.
R= right (closed)
L= left (open)

(2) Must turn off power before changing settings.

***Note:**

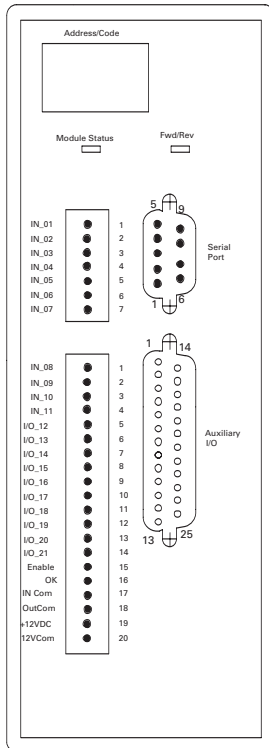
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

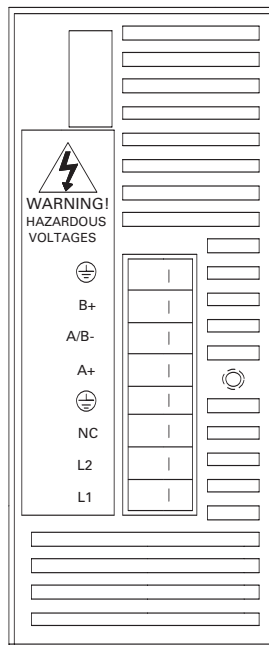
User Control Connections

S2K Model: ST1105 (Serial Communication)

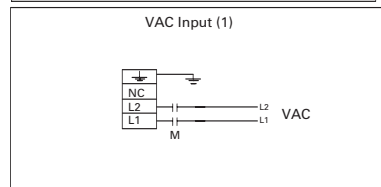
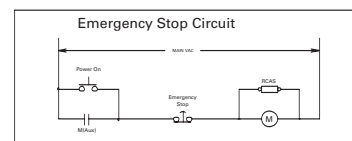
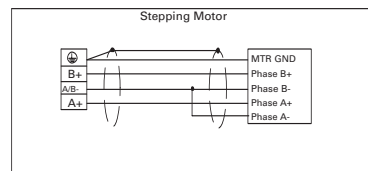
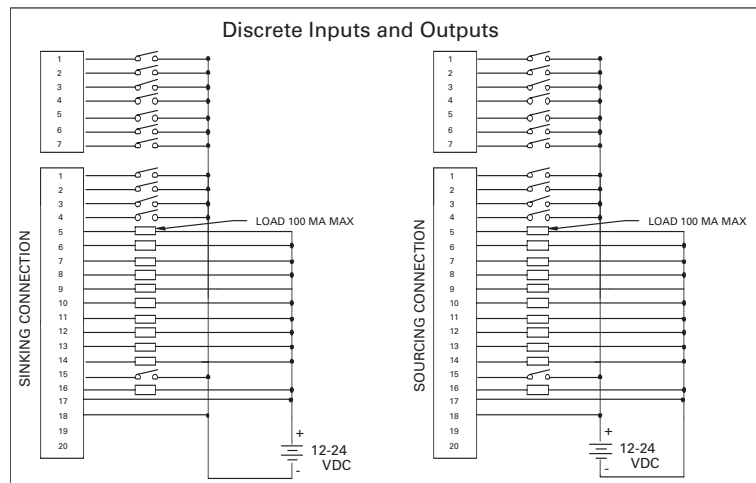
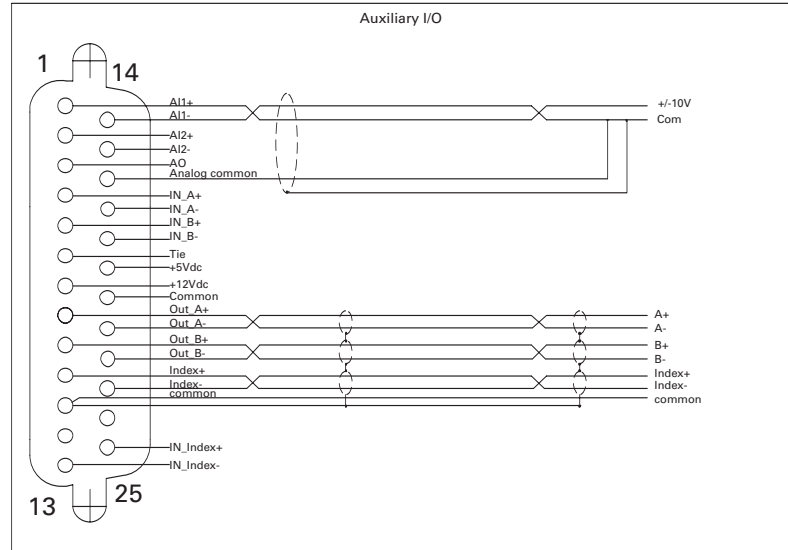
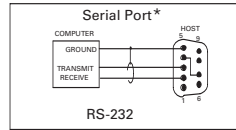
IC800ST1105S1



FRONT VIEW



BOTTOM VIEW



REMARKS:
 (1) Input power 90 to 130 VAC, 50-440 Hz
 1 phase @ 10 Amps.

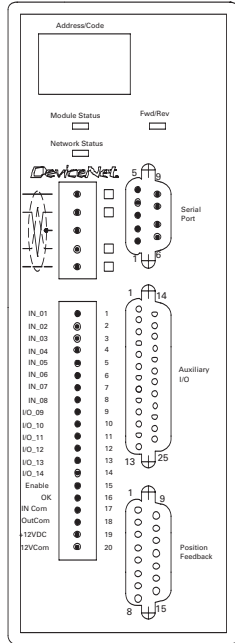
***Note:**
 The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

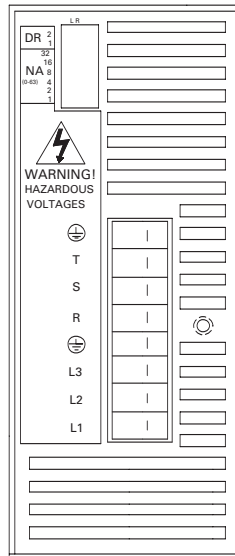
User Control Connections

S2K Model: SSI104 (DeviceNet Communication)

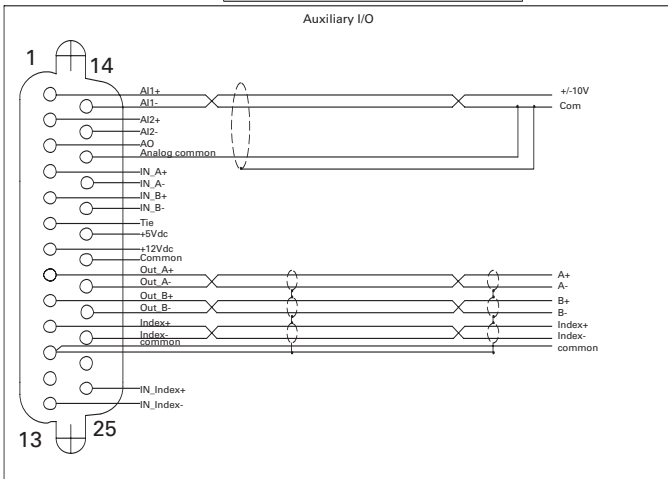
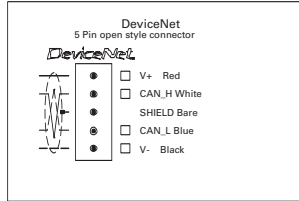
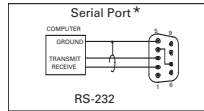
IC800SSI104D2
IC800SSI104RD2



FRONT VIEW



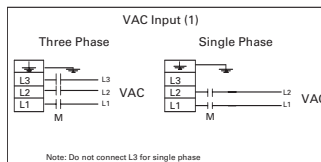
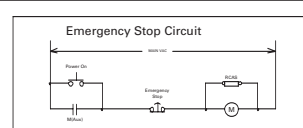
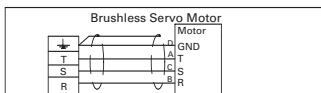
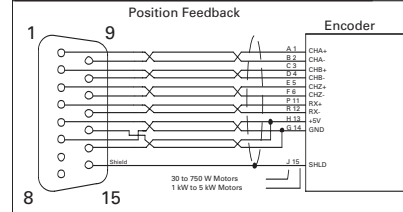
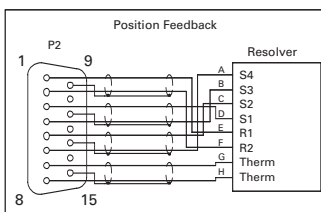
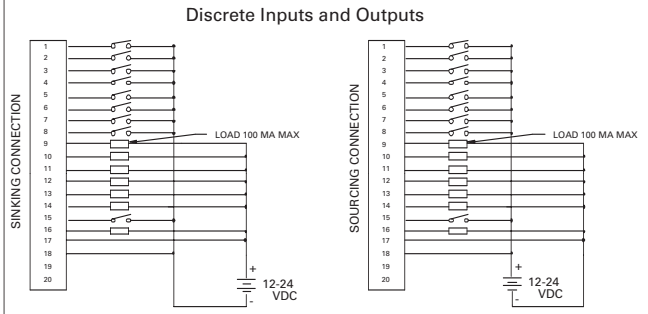
BOTTOM VIEW



DIP Switch Positions (2)

Device Net Address	1	2	4	8	16	32
0	R	R	R	R	R	R
1	L	R	R	R	R	R
2	R	L	R	R	R	R
3	L	L	R	R	R	R
4	R	L	L	R	R	R
5	L	L	L	R	R	R
6	R	L	L	L	R	R
7	L	L	L	L	R	R
8	R	L	L	L	L	R
9	L	L	L	L	L	R
10	R	L	L	L	L	L
11	L	L	L	L	L	L
12	R	L	L	L	L	L
13	L	L	L	L	L	L
14	R	L	L	L	L	L
15	L	L	L	L	L	L
16	R	L	L	L	L	L
17	L	L	L	L	L	L
18	R	L	L	L	L	L
19	L	L	L	L	L	L
20	R	L	L	L	L	L
21	L	L	L	L	L	L
22	R	L	L	L	L	L
23	L	L	L	L	L	L
24	R	L	L	L	L	L
25	L	L	L	L	L	L
26	R	L	L	L	L	L
27	L	L	L	L	L	L
28	R	L	L	L	L	L
29	L	L	L	L	L	L
30	R	L	L	L	L	L
31	L	L	L	L	L	L
32	R	L	L	L	L	L
33	L	L	L	L	L	L
34	R	L	L	L	L	L
35	L	L	L	L	L	L
36	R	L	L	L	L	L
37	L	L	L	L	L	L
38	R	L	L	L	L	L
39	L	L	L	L	L	L
40	R	L	L	L	L	L
41	L	L	L	L	L	L
42	R	L	L	L	L	L
43	L	L	L	L	L	L
44	R	L	L	L	L	L
45	L	L	L	L	L	L
46	R	L	L	L	L	L
47	L	L	L	L	L	L
48	R	L	L	L	L	L
49	L	L	L	L	L	L
50	R	L	L	L	L	L
51	L	L	L	L	L	L
52	R	L	L	L	L	L
53	L	L	L	L	L	L
54	R	L	L	L	L	L
55	L	L	L	L	L	L
56	R	L	L	L	L	L
57	L	L	L	L	L	L
58	R	L	L	L	L	L
59	L	L	L	L	L	L
60	R	L	L	L	L	L
61	L	L	L	L	L	L
62	R	L	L	L	L	L
63	L	L	L	L	L	L

Device Net Baud Rate	1	2
125K	R	R
250K	L	R
500K	R	L
NA	L	L



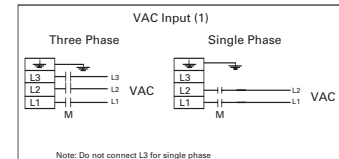
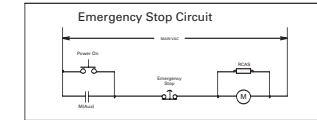
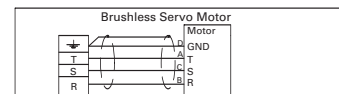
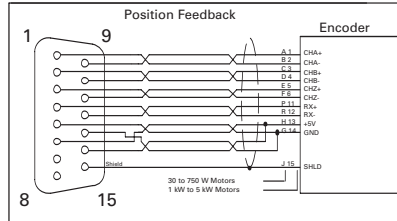
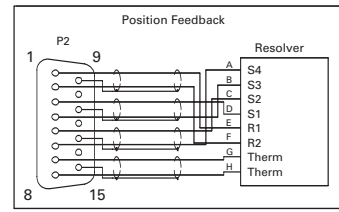
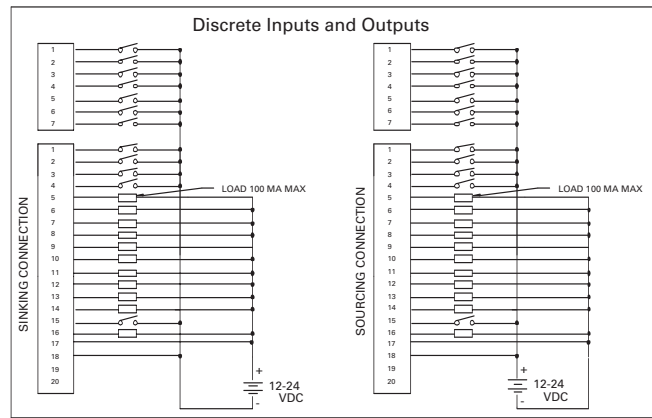
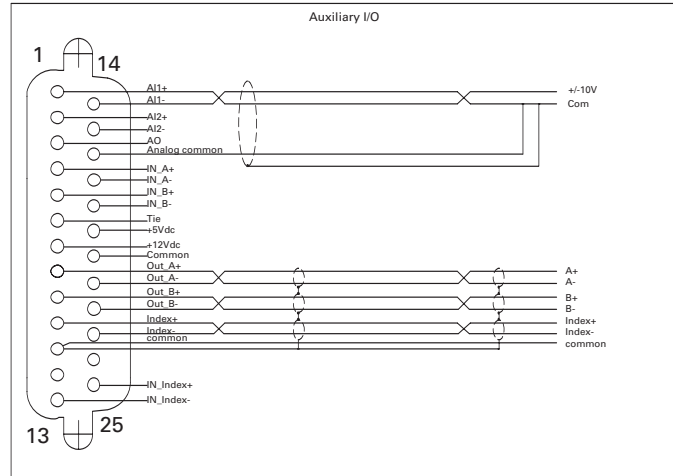
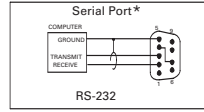
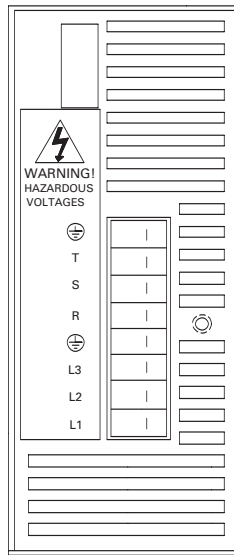
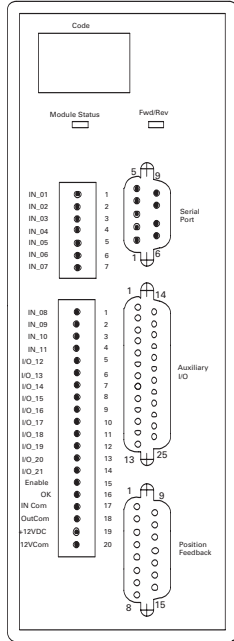
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Model: SSI104 (Serial Communication)

IC800SSI104S1
IC800SSI104RS1



REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 10 Amps, 3 phase @ 6 Amps

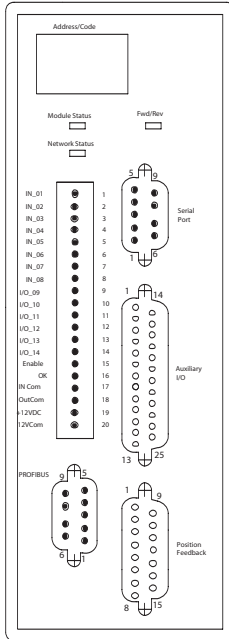
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

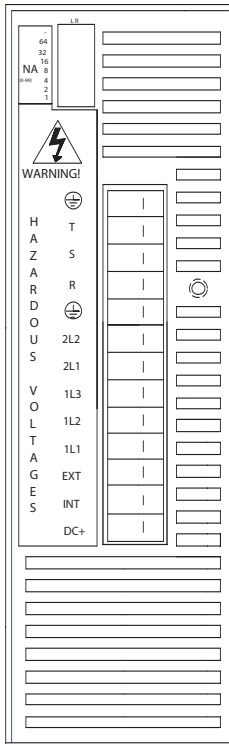
User Control Connections

S2K Model: SSI107 (Profibus Communication)

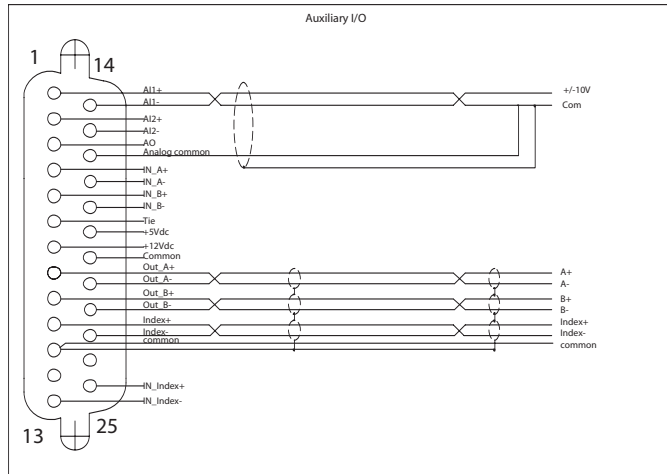
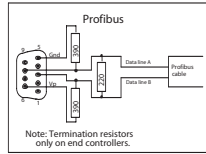
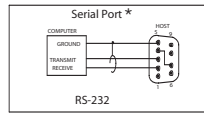
IC800SSI107P2
IC800SSI107RP2



FRONT VIEW



BOTTOM VIEW



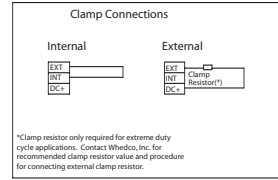
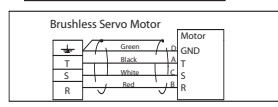
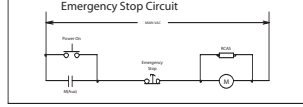
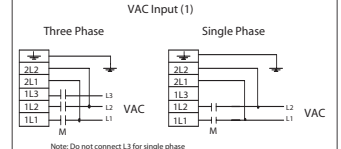
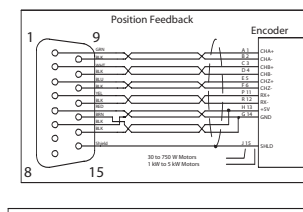
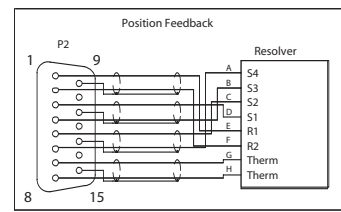
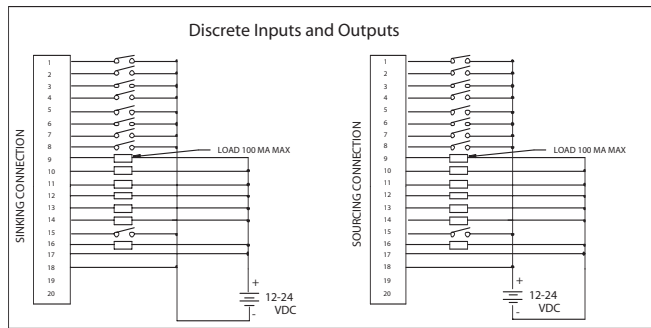
***Note:**

The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

DIP Switch Positions (2)

Profibus Address	1	2	4	8	16	32
(NA) 0 64	R	R	R	R	R	R
1 65	L	R	R	R	R	R
2 66	R	L	R	R	R	R
3 67	L	L	R	R	R	R
4 68	R	L	L	R	R	R
5 69	L	R	L	R	R	R
6 70	R	L	L	R	R	R
7 71	L	L	L	R	R	R
8 72	R	L	L	R	R	R
9 73	L	R	L	R	R	R
10 74	R	L	L	R	R	R
11 75	L	L	L	R	R	R
12 76	R	L	L	R	R	R
13 77	L	R	L	R	R	R
14 78	R	L	L	R	R	R
15 79	L	L	L	R	R	R
16 80	R	L	L	R	R	R
17 81	L	R	L	R	R	R
18 82	R	L	L	R	R	R
19 83	L	L	L	R	R	R
20 84	R	L	L	R	R	R
21 85	L	R	L	R	R	R
22 86	R	L	L	R	R	R
23 87	L	L	L	R	R	R
24 88	R	L	L	R	R	R
25 89	L	R	L	R	R	R
26 90	R	L	L	R	R	R
27 91	L	L	L	R	R	R
28 92	R	L	L	R	R	R
29 93	L	R	L	R	R	R
30 94	R	L	L	R	R	R
31 95	L	L	L	R	R	R
32 96	R	L	L	R	R	R
33 97	L	R	L	R	R	R
34 98	R	L	L	R	R	R
35 99	L	L	L	R	R	R
36 -	R	L	L	R	R	R
37 -	L	R	L	R	R	R
38 -	R	L	L	R	R	R
39 -	L	L	L	R	R	R
40 -	R	L	L	R	R	R
41 -	L	R	L	R	R	R
42 -	R	L	L	R	R	R
43 -	L	L	L	R	R	R
44 -	R	L	L	R	R	R
45 -	L	R	L	R	R	R
46 -	R	L	L	R	R	R
47 -	L	L	L	R	R	R
48 -	R	L	L	R	R	R
49 -	L	R	L	R	R	R
50 -	R	L	L	R	R	R
51 -	L	L	L	R	R	R
52 -	R	L	L	R	R	R
53 -	L	R	L	R	R	R
54 -	R	L	L	R	R	R
55 -	L	L	L	R	R	R
56 -	R	L	L	R	R	R
57 -	L	R	L	R	R	R
58 -	R	L	L	R	R	R
59 -	L	L	L	R	R	R
60 -	R	L	L	R	R	R
61 -	L	R	L	R	R	R
62 -	R	L	L	R	R	R
63 -	L	L	L	R	R	R

Profibus address 0-63 R X
64-99 L X



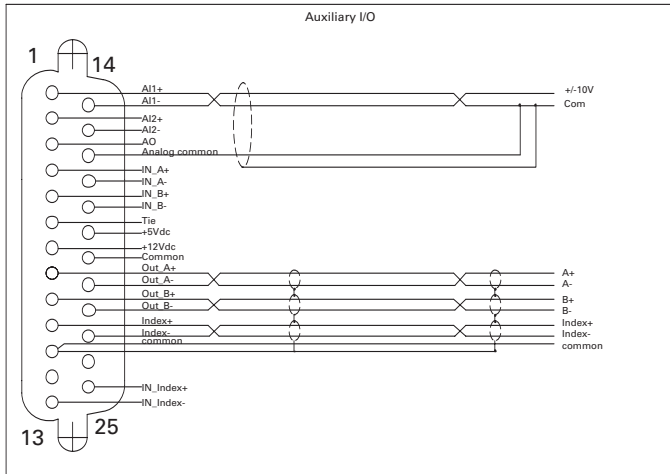
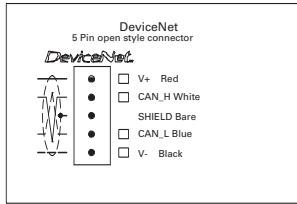
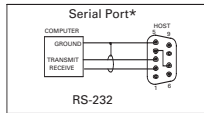
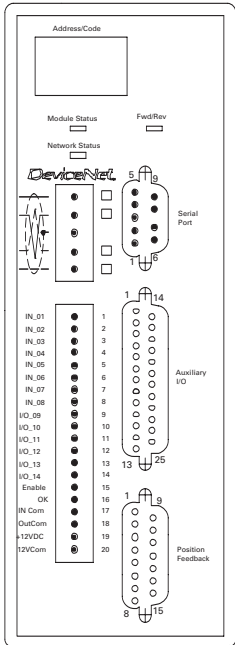
REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 15 Amps, 3 phase @ 8 Amps
(2) Must turn off power before changing settings.
R= right (closed)
L= left (open)

S2K Series

User Control Connections

S2K Model: SSI107 (DeviceNet Communication)

IC800SSI107D2
IC800SSI107R2



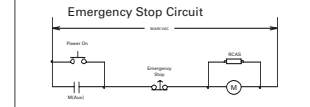
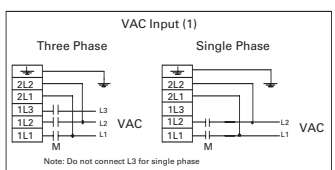
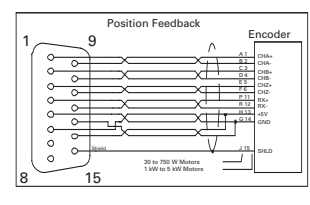
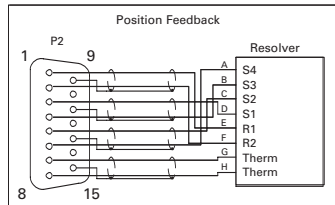
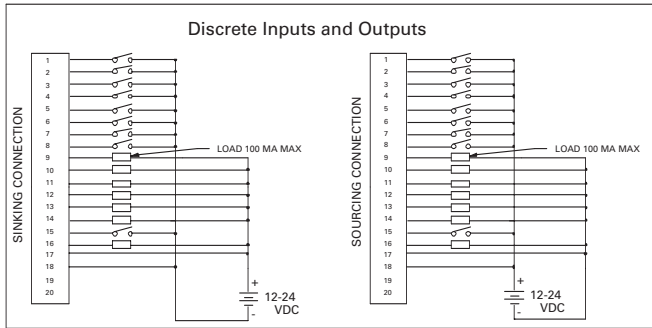
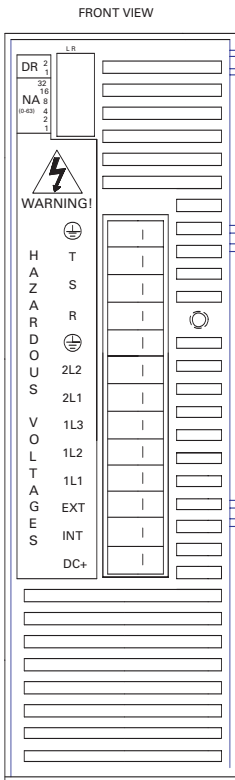
***Note:**

The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

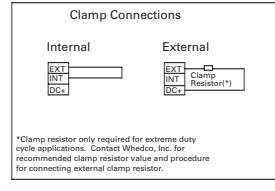
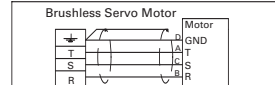
DIP Switch Positions (2)

Device Net Address	1	2	4	8	16	32
(NA)	0	R	R	R	R	R
1	L	R	R	R	R	R
2	R	L	R	R	R	R
3	L	L	R	R	R	R
4	R	R	L	R	R	R
5	L	R	L	R	R	R
6	R	L	L	R	R	R
7	L	L	L	R	R	R
8	R	R	L	L	R	R
9	L	R	R	L	R	R
10	R	L	R	L	R	R
11	L	L	R	L	R	R
12	R	L	L	L	R	R
13	L	L	L	L	R	R
14	R	L	L	L	L	R
15	L	L	L	L	L	R
16	R	R	L	L	L	R
17	L	R	R	L	L	R
18	R	L	R	L	L	R
19	L	L	R	L	L	R
20	R	R	L	L	L	R
21	L	L	L	L	L	R
22	R	L	L	L	L	R
23	L	L	L	L	L	R
24	R	R	L	L	L	R
25	L	R	L	L	L	R
26	R	L	L	L	L	R
27	L	L	L	L	L	R
28	R	L	L	L	L	R
29	L	L	L	L	L	R
30	R	L	L	L	L	R
31	L	L	L	L	L	R
32	R	R	L	L	L	R
33	L	R	R	L	L	R
34	R	L	R	L	L	R
35	L	L	R	L	L	R
36	R	R	L	L	L	R
37	L	L	L	L	L	R
38	R	L	L	L	L	R
39	L	L	L	L	L	R
40	R	R	L	L	L	R
41	L	R	R	L	L	R
42	R	L	R	L	L	R
43	L	L	R	L	L	R
44	R	L	L	L	L	R
45	L	L	L	L	L	R
46	R	L	L	L	L	R
47	L	L	L	L	L	R
48	R	R	L	L	L	R
49	L	R	R	L	L	R
50	R	L	R	L	L	R
51	L	L	R	L	L	R
52	R	L	L	L	L	R
53	L	L	L	L	L	R
54	R	L	L	L	L	R
55	L	L	L	L	L	R
56	R	R	L	L	L	R
57	L	R	L	L	L	R
58	R	L	L	L	L	R
59	L	L	L	L	L	R
60	R	L	L	L	L	R
61	L	L	L	L	L	R
62	R	L	L	L	L	R
63	L	L	L	L	L	R

Device Net	1	2
Stand	R	R
Rate	250K	R
(DR)	500K	R
	N/A	L



REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 15 Amps, 3 phase @ 8 Amps
(2) Must turn off power before changing settings.
R= right (closed)
L= left (open)



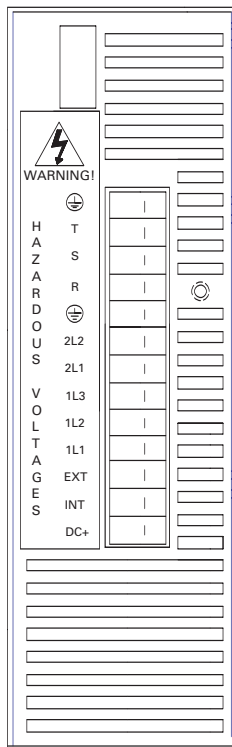
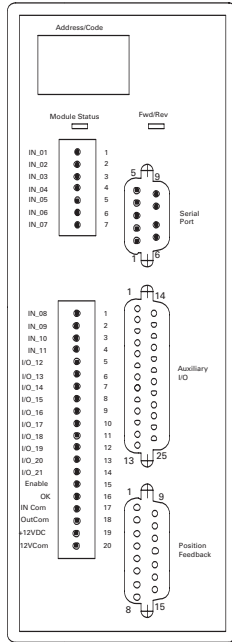
*Clamp resistor only required for extreme duty cycle applications. Contact Whedco, Inc. for recommended clamp resistor value and procedure for connecting external clamp resistor.

S2K Series

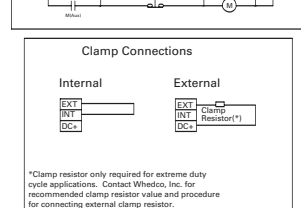
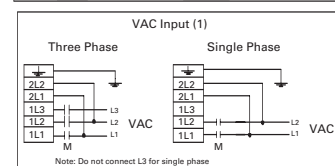
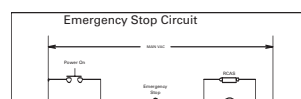
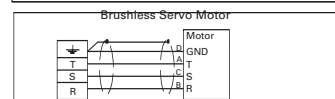
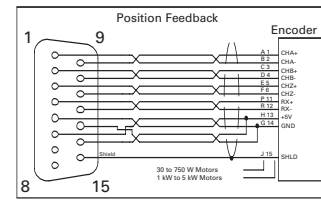
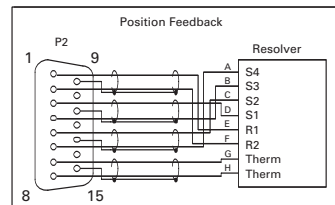
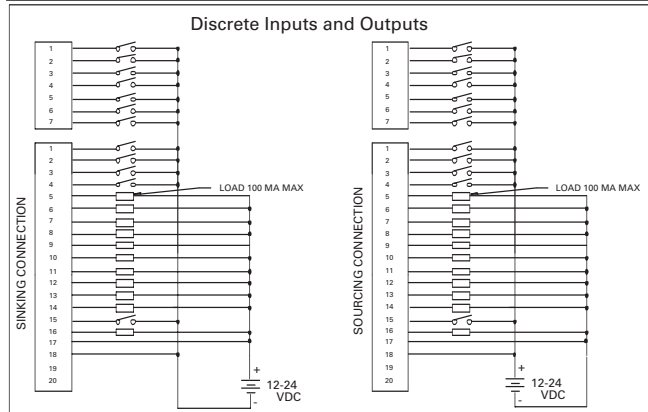
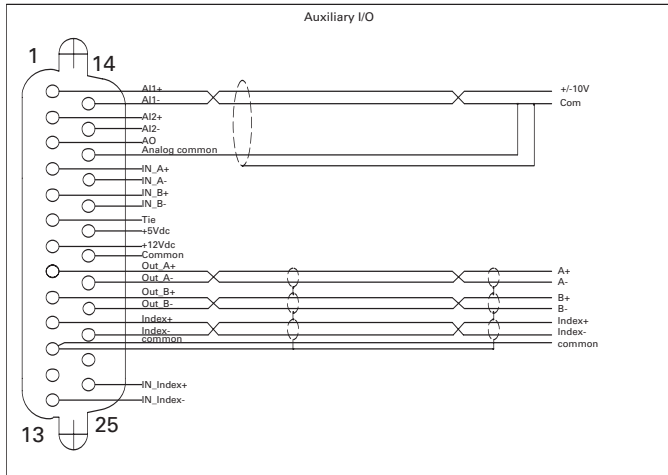
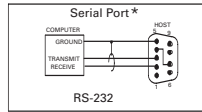
User Control Connections

S2K Model: SSI107 (Serial Communication)

IC800SSI107S1
IC800SSI107RS1



BOTTOM VIEW



REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 15 Amps, 3 phase @ 8 Amps

*Clamp resistor only required for extreme duty cycle applications. Contact Whedco, Inc. for recommended clamp resistor value and procedure for connecting external clamp resistor.

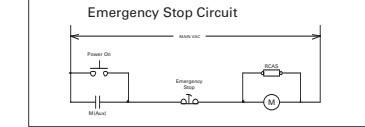
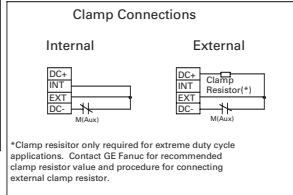
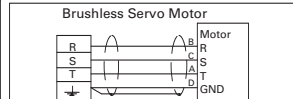
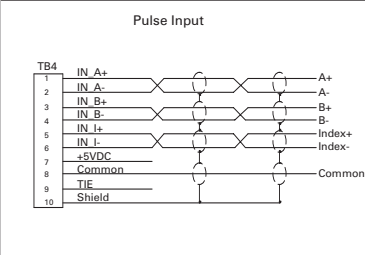
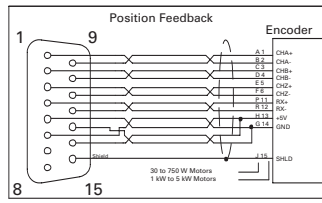
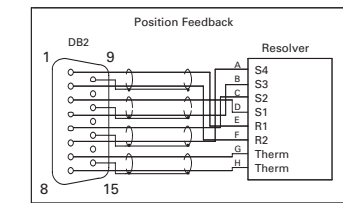
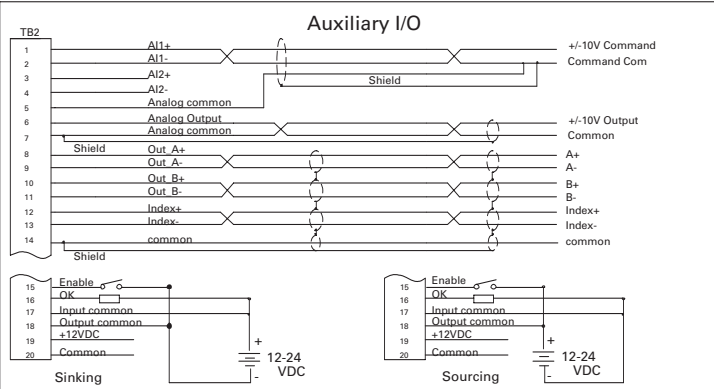
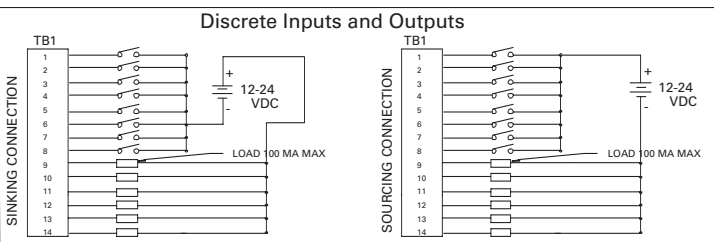
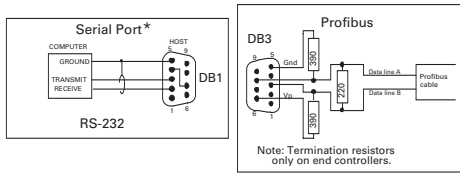
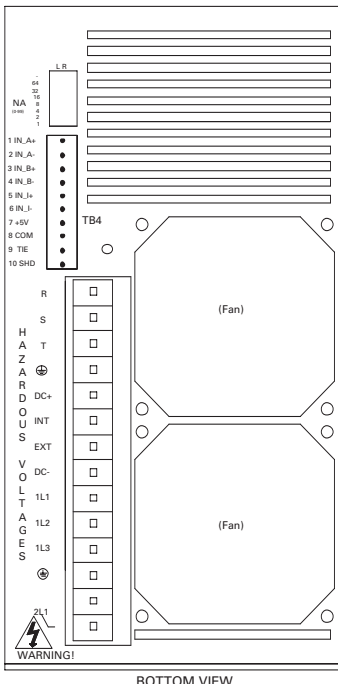
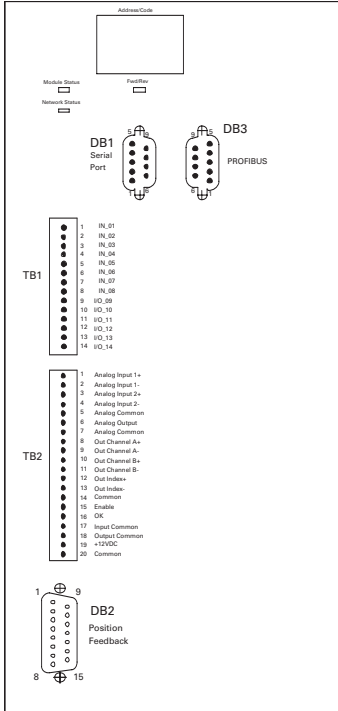
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Models: SSI216 and SSI228 (Profibus Communications)

IC800SSI216P2 IC800SSI216RP2
 IC800SSI228P2 IC800SSI228RP2



REMARKS:

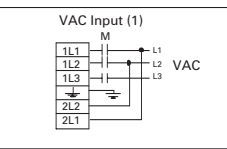
- (1) Input power 180 to 250 VAC, 3 phase 50-440 Hz @ 18 Amps for IC800SSI216RP2A, 3 phase 50-440 Hz @ 30 Amps for IC800SSI228RP2A
- (2) Must turn off power before changing settings.

R= right (closed)
 L= left (open)

DIP Switch Positions (2)

Profibus Address	1	2	4	8	16	32
(NA) 0	64	R	R	R	R	R
1	65	L	R	R	R	R
2	66	R	L	R	R	R
3	67	L	L	R	R	R
4	68	R	L	R	R	R
5	69	L	L	R	R	R
6	70	R	L	R	R	R
7	71	L	L	R	R	R
8	72	R	R	L	R	R
9	73	L	R	L	R	R
10	74	R	L	R	L	R
11	75	L	L	R	L	R
12	76	R	L	R	L	R
13	77	L	L	R	L	R
14	78	R	L	R	L	R
15	79	L	L	R	L	R
16	80	R	L	R	L	R
17	81	L	L	R	L	R
18	82	R	L	R	L	R
19	83	L	L	R	L	R
20	84	R	L	R	L	R
21	85	L	L	R	L	R
22	86	R	L	R	L	R
23	87	L	L	R	L	R
24	88	R	L	R	L	R
25	89	L	L	R	L	R
26	90	R	L	R	L	R
27	91	L	L	R	L	R
28	92	R	L	R	L	R
29	93	L	L	R	L	R
30	94	R	L	R	L	R
31	95	L	L	R	L	R
32	96	R	L	R	L	R
33	97	L	L	R	L	R
34	98	R	L	R	L	R
35	99	L	L	R	L	R
36	-	R	L	R	L	R
37	-	L	L	R	L	R
38	-	R	L	R	L	R
39	-	L	L	R	L	R
40	-	R	L	R	L	R
41	-	L	L	R	L	R
42	-	R	L	R	L	R
43	-	L	L	R	L	R
44	-	R	L	R	L	R
45	-	L	L	R	L	R
46	-	R	L	R	L	R
47	-	L	L	R	L	R
48	-	R	L	R	L	R
49	-	L	L	R	L	R
50	-	R	L	R	L	R
51	-	L	L	R	L	R
52	-	R	L	R	L	R
53	-	L	L	R	L	R
54	-	R	L	R	L	R
55	-	L	L	R	L	R
56	-	R	L	R	L	R
57	-	L	L	R	L	R
58	-	R	L	R	L	R
59	-	L	L	R	L	R
60	-	R	L	R	L	R
61	-	L	L	R	L	R
62	-	R	L	R	L	R
63	-	L	L	R	L	R

Profibus address 0-63 R X
 64-99 L X



***Note:**
 The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

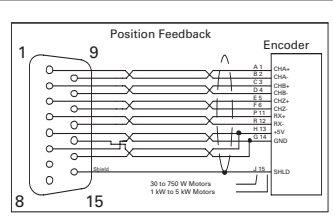
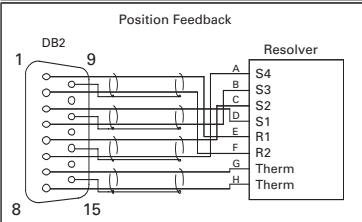
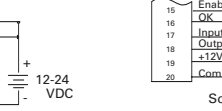
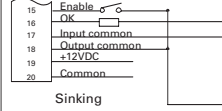
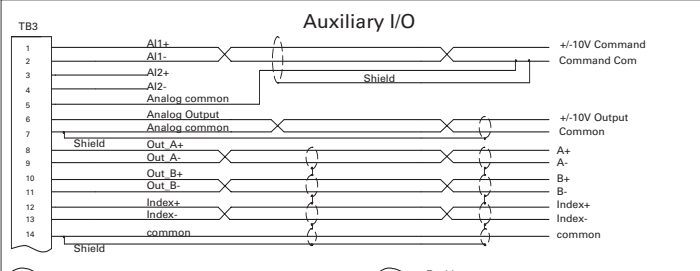
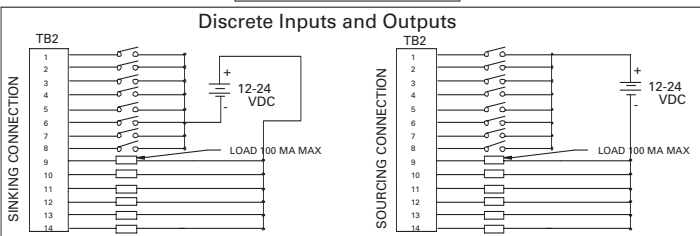
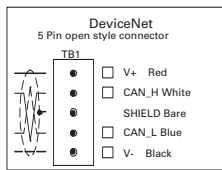
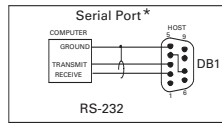
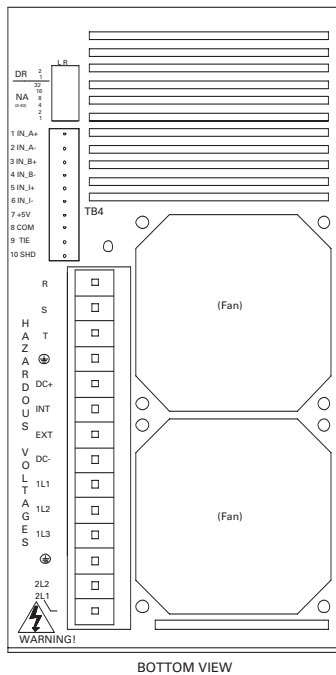
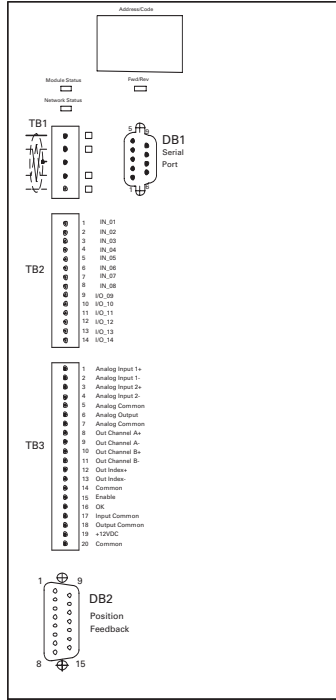
S2K Models: SSI216 and SSI228 (DeviceNet Communications)

IC800SSI216D2

IC800SSI216RD2

IC800SSI228D2

IC800SSI228RD2

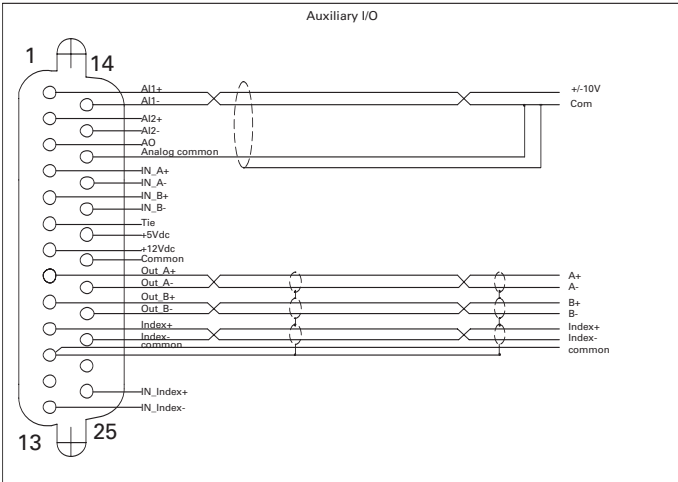
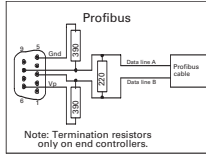
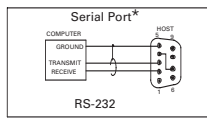
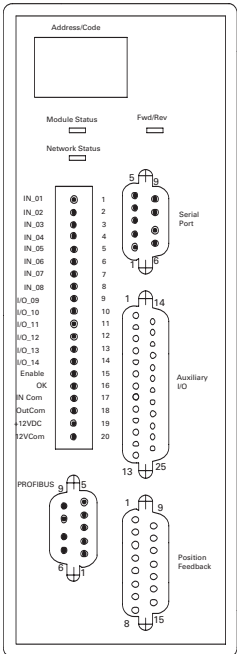


S2K Series

User Control Connections

S2K Model: SSI407 (Profibus Communications)

IC800SSI407RP2

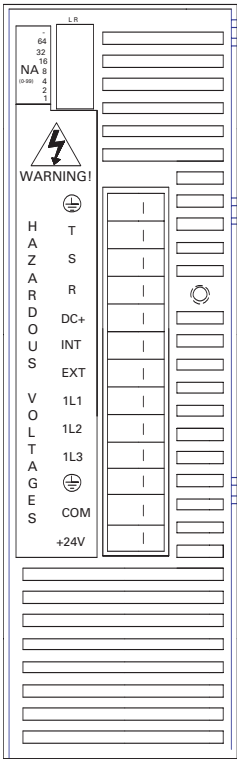


DIP Switch Positions (2)

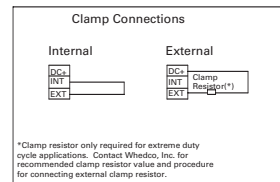
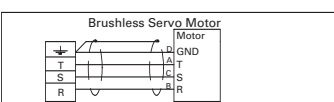
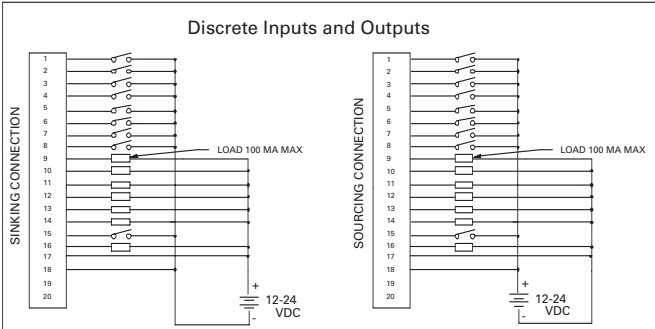
Profibus Address	1	2	4	8	16	32
(NA) 0 64	R	R	R	R	R	R
1 65	L	R	R	R	R	R
2 66	L	R	R	R	R	R
3 67	L	R	R	R	R	R
4 68	R	R	L	R	R	R
5 69	L	R	L	R	R	R
6 70	R	L	R	R	R	R
7 71	L	L	R	R	R	R
8 72	R	R	R	L	R	R
9 73	L	R	R	L	R	R
10 74	R	L	R	R	L	R
11 75	L	L	R	L	R	R
12 76	R	R	L	L	R	R
13 77	L	R	L	L	R	R
14 78	R	L	R	L	L	R
15 79	L	L	R	L	L	R
16 80	R	R	R	L	L	R
17 81	L	R	R	L	L	R
18 82	R	L	R	L	L	R
19 83	L	L	R	L	L	R
20 84	R	R	L	L	L	R
21 85	L	R	L	L	L	R
22 86	R	L	R	L	L	R
23 87	L	L	R	L	L	R
24 88	R	R	L	L	L	R
25 89	L	R	R	L	L	R
26 90	R	L	R	L	L	R
27 91	L	L	R	L	L	R
28 92	R	R	L	L	L	R
29 93	L	R	L	L	L	R
30 94	R	L	R	L	L	R
31 95	L	L	R	L	L	R
32 96	R	R	L	L	L	R
33 97	L	R	R	L	L	R
34 98	R	L	R	L	L	R
35 99	L	L	R	L	L	R
36 -	R	R	L	L	L	R
37 -	L	R	R	L	L	R
38 -	R	L	R	L	L	R
39 -	L	L	R	L	L	R
40 -	R	R	L	L	L	R
41 -	L	R	R	L	L	R
42 -	R	L	R	L	L	R
43 -	L	L	R	L	L	R
44 -	R	R	L	L	L	R
45 -	L	R	R	L	L	R
46 -	R	L	R	L	L	R
47 -	L	L	R	L	L	R
48 -	R	R	L	L	L	R
49 -	L	R	R	L	L	R
50 -	R	L	R	L	L	R
51 -	L	L	R	L	L	R
52 -	R	R	L	L	L	R
53 -	L	R	R	L	L	R
54 -	R	L	R	L	L	R
55 -	L	L	R	L	L	R
56 -	R	R	L	L	L	R
57 -	L	R	R	L	L	R
58 -	R	L	R	L	L	R
59 -	L	L	R	L	L	R
60 -	R	R	L	L	L	R
61 -	L	R	R	L	L	R
62 -	R	L	R	L	L	R
63 -	L	L	R	L	L	R

Profibus address 0-63 R X
64-99 L X

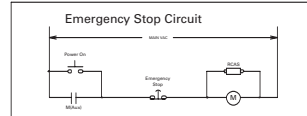
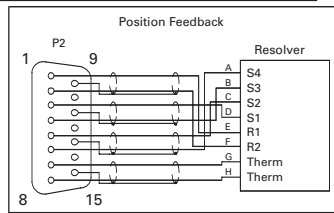
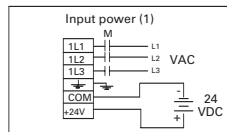
FRONT VIEW



BOTTOM VIEW



*Clamp resistor only required for extreme duty cycle applications. Contact Whedco, Inc. for recommended clamp resistor value and procedure for connecting external clamp resistor.



REMARKS:

- Input motor power 324 to 528 VAC
3 phase 50-440 Hz @ 9 Amps
Input logic power 18 to 30 VDC @ 2 Amps
- Must turn off power before changing settings.
R= right (closed)
L= left (open)

*Note:

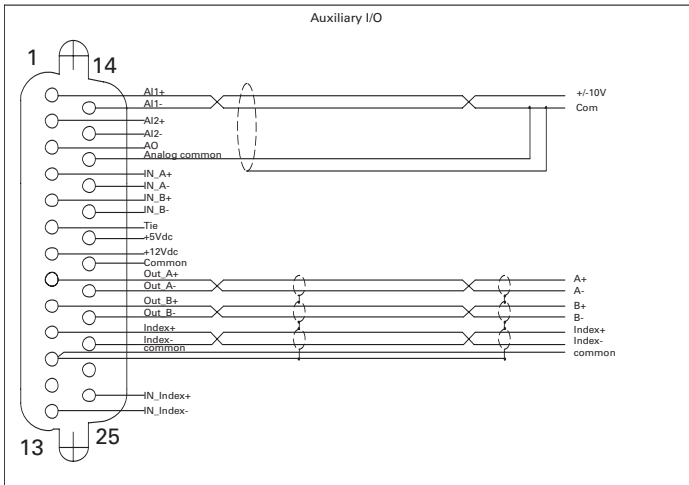
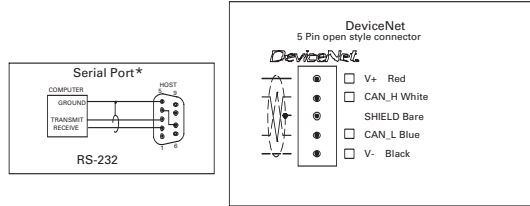
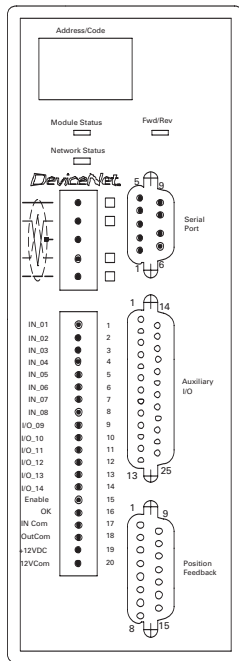
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Model: SSI407 (DeviceNet Communications)

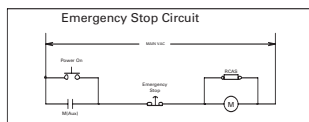
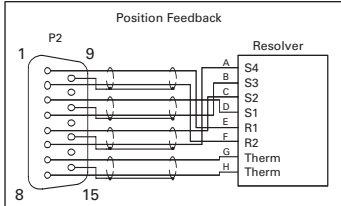
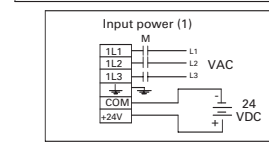
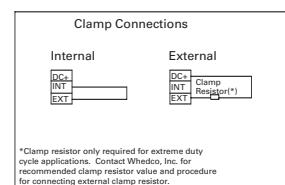
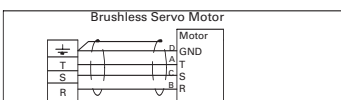
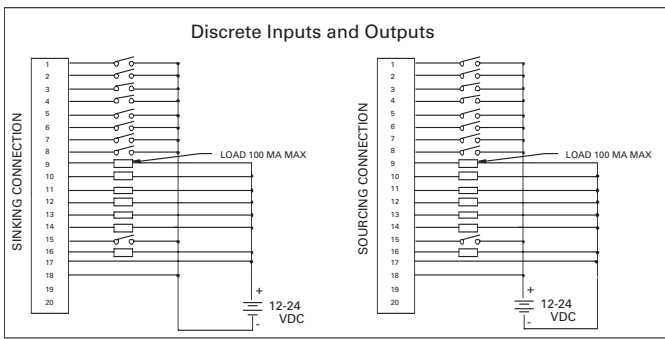
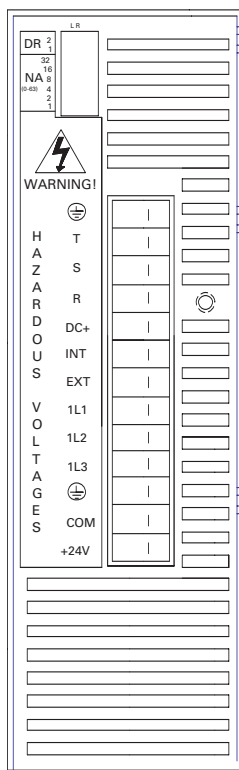
IC800SSI407RD2



DIP Switch Positions (2)

Device Net Address	1	2	4	8	16	32
(NA)	0	R	R	R	R	R
1	L	R	R	R	R	R
2	R	L	R	R	R	R
3	L	L	R	R	R	R
4	R	R	L	R	R	R
5	L	R	L	R	R	R
6	R	L	L	R	R	R
7	L	L	L	R	R	R
8	R	R	R	L	R	R
9	L	R	R	L	R	R
10	R	L	R	L	R	R
11	L	L	R	L	R	R
12	R	R	L	R	R	R
13	L	L	L	R	R	R
14	R	L	L	R	R	R
15	L	L	L	L	R	R
16	R	R	R	L	R	R
17	L	R	R	L	R	R
18	R	L	R	L	R	R
19	L	L	R	L	R	R
20	R	R	L	R	R	R
21	L	L	L	R	R	R
22	R	L	L	R	R	R
23	L	L	L	L	R	R
24	R	R	R	L	R	R
25	L	R	R	L	R	R
26	R	L	R	L	R	R
27	L	L	R	L	R	R
28	R	R	L	R	R	R
29	L	L	L	R	R	R
30	R	L	L	R	R	R
31	L	L	L	L	R	R
32	R	R	R	L	R	R
33	L	R	R	L	R	R
34	R	L	R	L	R	R
35	L	L	R	L	R	R
36	R	R	L	R	R	R
37	L	R	R	L	R	R
38	R	L	R	L	R	R
39	L	L	R	L	R	R
40	R	R	L	R	R	R
41	L	R	R	L	R	R
42	R	L	R	L	R	R
43	L	L	R	L	R	R
44	R	R	L	R	R	R
45	L	L	L	R	R	R
46	R	L	R	L	R	R
47	L	L	R	L	R	R
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52	R	R	L	R	R	R
53	L	L	L	R	R	R
54	R	L	R	L	R	R
55	L	L	R	L	R	R
56	R	R	L	R	R	R
57	L	R	R	L	R	R
58	R	L	R	L	R	R
59	L	L	R	L	R	R
60	R	R	L	R	R	R
61	L	L	L	R	R	R
62	R	L	R	L	R	R
63	L	L	L	L	R	R

Device Net Baud Rate	1	2
125K	R	R
250K	L	R
500K	R	L
N/A	L	L



REMARKS:

(1) Input motor power 324 to 528 VAC
3 phase 50-440 Hz @ 8 Amps
Input logic power 18 to 30 VDC @ 2 Amps

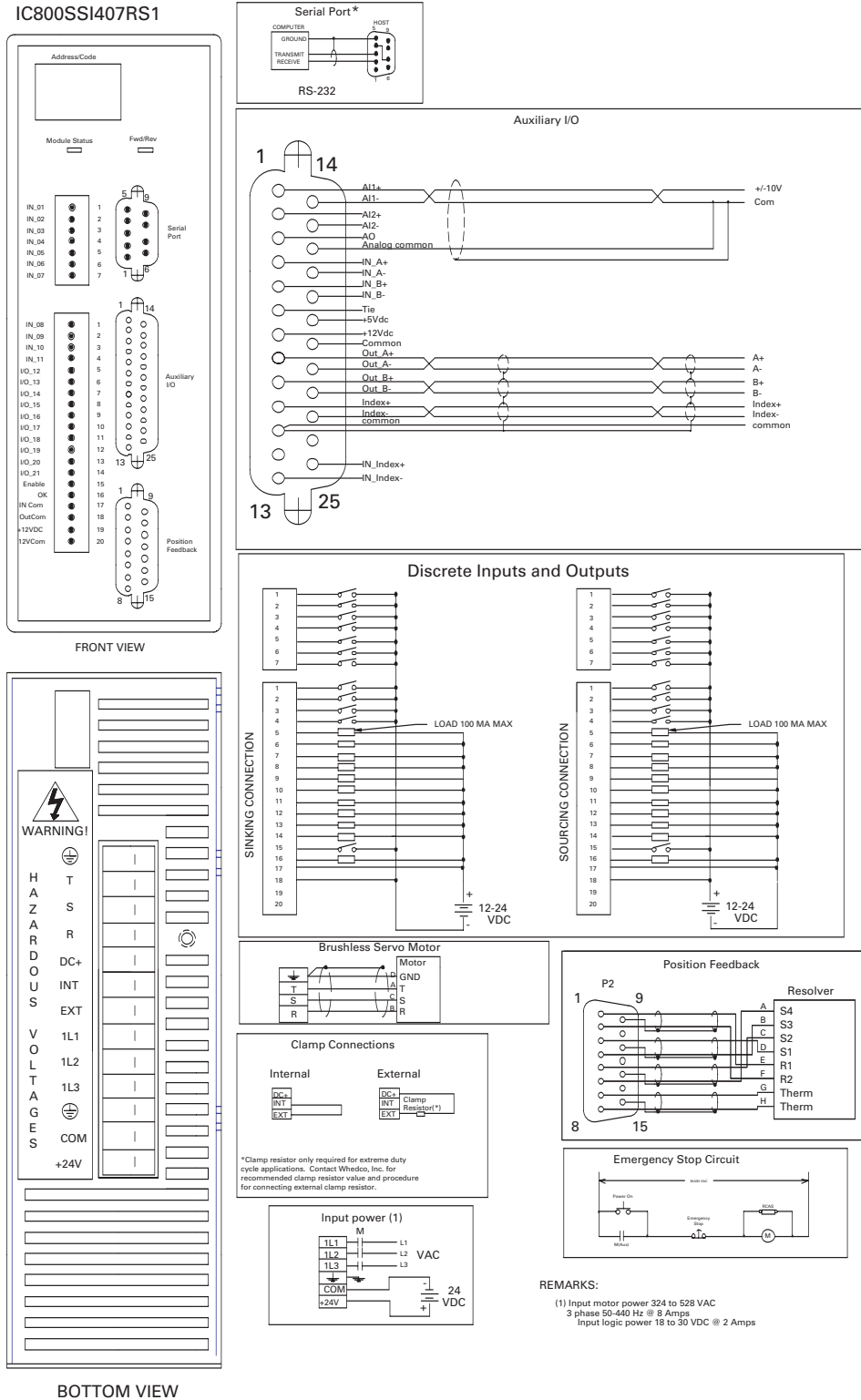
(2) Must turn off power before changing settings.
R= right (closed)
L= left (open)

***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Model: SSI407 (Serial Communication)



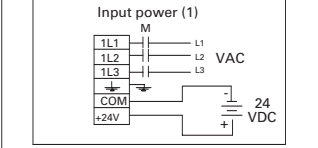
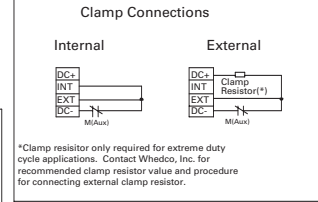
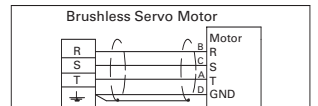
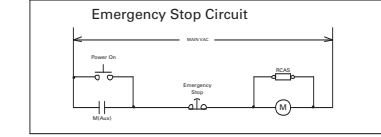
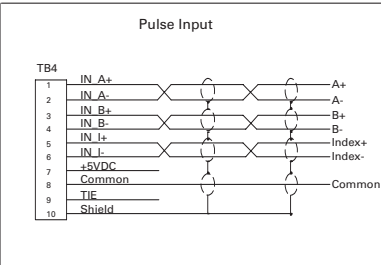
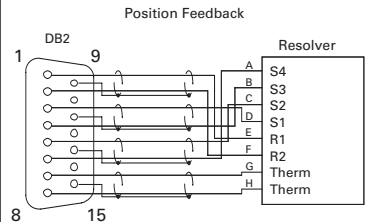
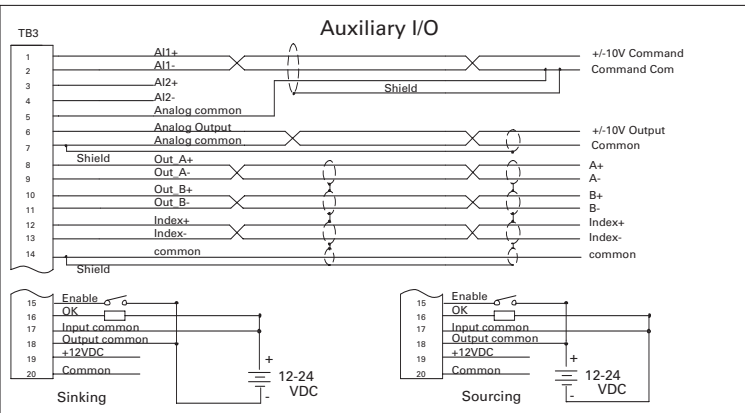
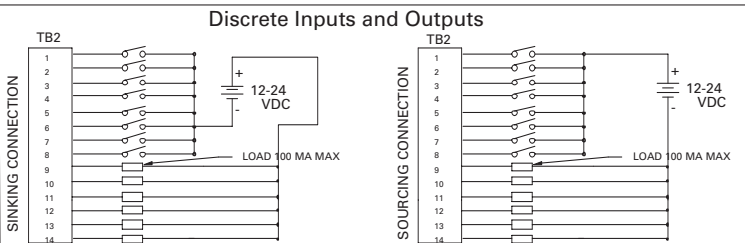
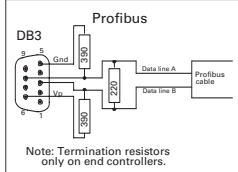
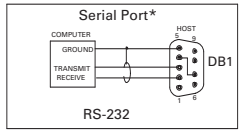
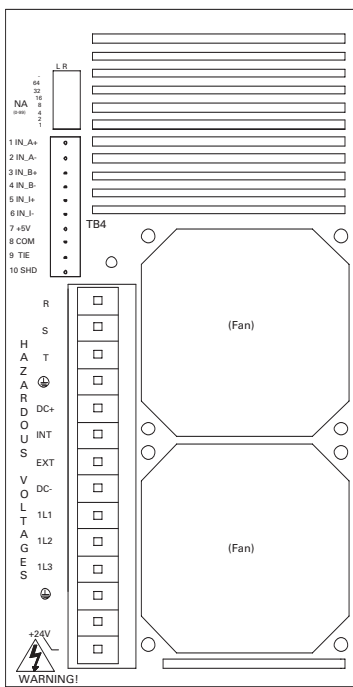
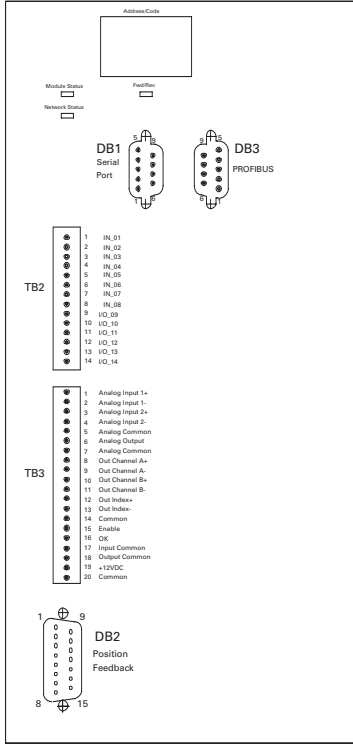
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

User Control Connections

S2K Model: SSI420 (Profibus Communication)

IC800SSI420RP2



REMARKS:

(1) Input motor power 324 to 528 VAC
3 phase 50-440 Hz @ 22 Amps
Input logic power 18 to 30 VDC @ 2 Amps

(2) Must turn off power before changing settings.
R= right (closed)
L= left (open)

DIP Switch Positions (2)

Profibus Address	1	2	4	8	16	32
(NA) 0 64	R	R	R	R	R	R
1 65	L	R	R	R	R	R
2 66	L	L	R	R	R	R
3 67	L	L	L	R	R	R
4 68	R	L	L	R	R	R
5 69	L	R	L	R	R	R
6 70	R	L	L	R	R	R
7 71	L	L	L	R	R	R
8 72	R	R	L	R	R	R
9 73	L	R	L	R	R	R
10 74	R	L	L	R	R	R
11 75	L	L	L	R	R	R
12 76	R	R	L	R	R	R
13 77	L	R	L	R	R	R
14 78	L	L	L	R	R	R
15 79	L	L	L	R	R	R
16 80	R	L	L	R	R	R
17 81	L	R	L	R	R	R
18 82	R	R	L	R	R	R
19 83	L	L	L	R	R	R
20 84	R	R	L	R	R	R
21 85	L	L	L	R	R	R
22 86	R	L	L	R	R	R
23 87	L	R	L	R	R	R
24 88	L	L	L	R	R	R
25 89	R	R	L	R	R	R
26 90	L	L	L	R	R	R
27 91	L	L	L	R	R	R
28 92	R	R	L	R	R	R
29 93	L	R	L	R	R	R
30 94	R	L	L	R	R	R
31 95	L	L	L	R	R	R
32 96	R	R	L	R	R	R
33 97	L	R	L	R	R	R
34 98	L	L	L	R	R	R
35 99	L	L	L	R	R	R
36 -	R	L	L	R	R	R
37 -	L	R	L	R	R	R
38 -	R	L	L	R	R	R
39 -	L	L	L	R	R	R
40 -	R	R	L	R	R	R
41 -	L	R	L	R	R	R
42 -	L	L	L	R	R	R
43 -	L	L	L	R	R	R
44 -	R	L	L	R	R	R
45 -	L	L	L	R	R	R
46 -	L	L	L	R	R	R
47 -	L	L	L	R	R	R
48 -	R	R	L	R	R	R
49 -	L	R	L	R	R	R
50 -	R	L	L	R	R	R
51 -	L	L	L	R	R	R
52 -	R	R	L	R	R	R
53 -	L	L	L	R	R	R
54 -	R	L	L	R	R	R
55 -	L	L	L	R	R	R
56 -	R	R	L	R	R	R
57 -	L	R	L	R	R	R
58 -	R	L	L	R	R	R
59 -	L	L	L	R	R	R
60 -	R	R	L	R	R	R
61 -	L	L	L	R	R	R
62 -	R	L	L	R	R	R
63 -	L	L	L	R	R	R

Profibus address 64 -

0-63 R X
64-99 L X

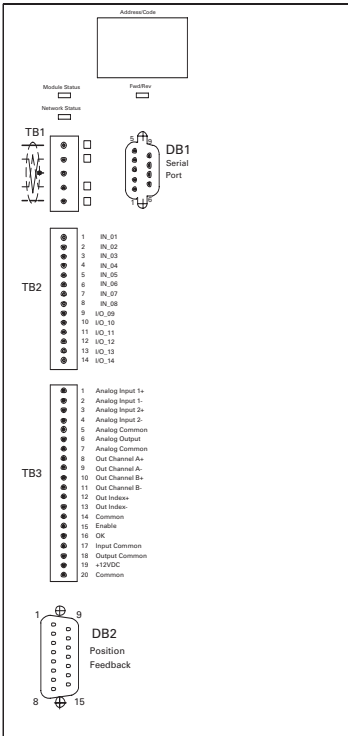
***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

S2K Series

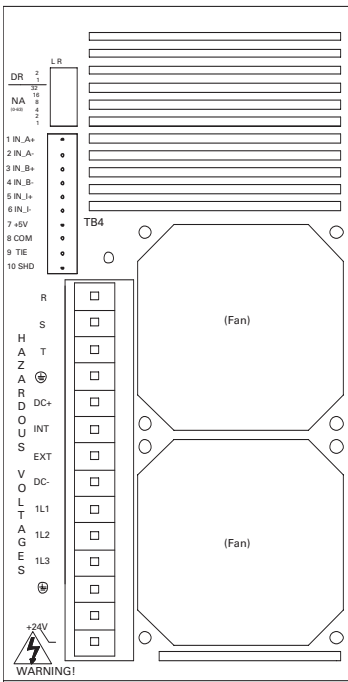
User Control Connections

S2K Model: SSI420 (DeviceNet Communication)

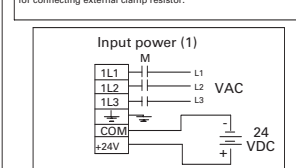
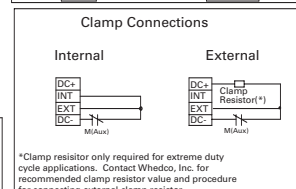
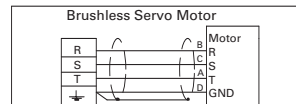
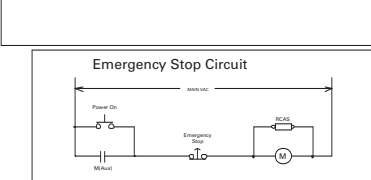
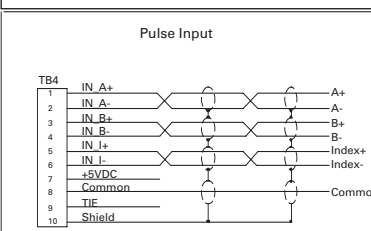
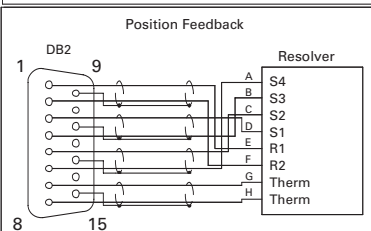
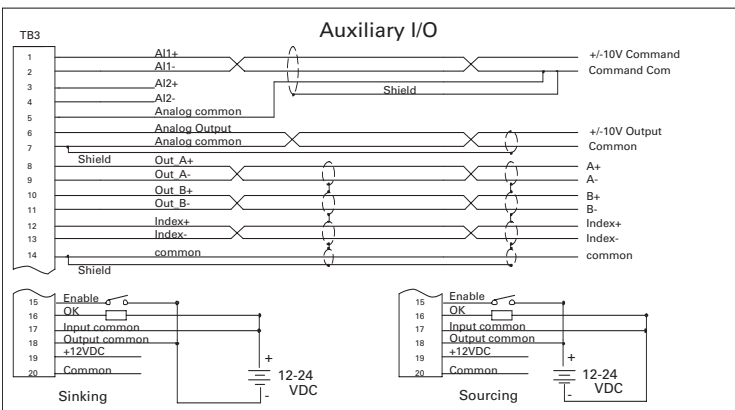
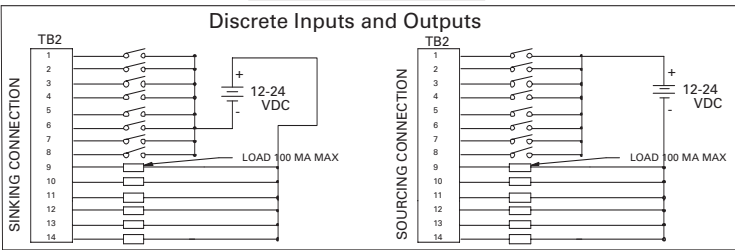
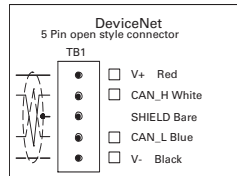
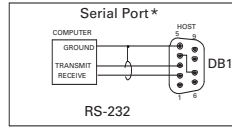
IC800SSI420RD2



FRONT VIEW



BOTTOM VIEW



DIP Switch Positions (2)

Device Net Address	1	2	4	8	16	32
(NA)	0	R	R	R	R	R
1	L	R	R	R	R	R
2	R	L	R	R	R	R
3	L	L	R	R	R	R
4	R	L	L	R	R	R
5	L	R	L	L	R	R
6	R	R	L	L	R	R
7	L	L	R	L	R	R
8	R	R	R	L	R	R
9	L	R	R	L	R	R
10	R	L	R	L	R	R
11	L	L	R	L	R	R
12	R	L	L	R	R	R
13	L	R	L	L	R	R
14	R	L	L	R	R	R
15	L	L	R	L	R	R
16	R	R	L	L	R	R
17	L	L	R	L	R	R
18	R	L	L	R	R	R
19	L	R	L	L	R	R
20	R	R	L	L	R	R
21	L	L	R	L	R	R
22	R	L	L	R	R	R
23	L	R	L	L	R	R
24	R	R	L	L	R	R
25	L	L	R	L	R	R
26	R	L	L	R	R	R
27	L	R	L	L	R	R
28	R	R	L	L	R	R
29	L	L	R	L	R	R
30	R	L	L	R	R	R
31	L	R	L	L	R	R
32	R	R	L	L	R	R
33	L	L	R	L	R	R
34	R	L	L	R	R	R
35	L	R	L	L	R	R
36	R	R	L	L	R	R
37	L	L	R	L	R	R
38	R	L	L	R	R	R
39	L	R	L	L	R	R
40	R	R	L	L	R	R
41	L	L	R	L	R	R
42	R	L	L	R	R	R
43	L	R	L	L	R	R
44	R	R	L	L	R	R
45	L	L	R	L	R	R
46	R	L	L	R	R	R
47	L	R	L	L	R	R
48	R	R	L	L	R	R
49	L	L	R	L	R	R
50	R	L	L	R	R	R
51	L	R	L	L	R	R
52	R	L	L	R	R	R
53	L	R	L	L	R	R
54	R	L	L	R	R	R
55	L	L	R	L	R	R
56	R	L	L	R	R	R
57	L	R	L	L	R	R
58	R	R	L	L	R	R
59	L	L	R	L	R	R
60	R	L	L	R	R	R
61	L	R	L	L	R	R
62	R	L	L	R	R	R
63	L	L	R	L	R	R

Device Net Baud Rate (DR)	1	2
125K	R	R
250K	L	R
500K	R	L
N/A	L	L

REMARKS:
 (1) Input motor power 324 to 528 VAC
 3 phase 50-440 Hz @ 22 Amps
 Input logic power 18 to 30 VDC @ 2 Amps
 (2) Must turn off power before changing settings.
 R= right (closed)
 L= left (open)

***Note:**
 The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

Motion Controllers

S2K Series is Ready to Network

DeviceNet

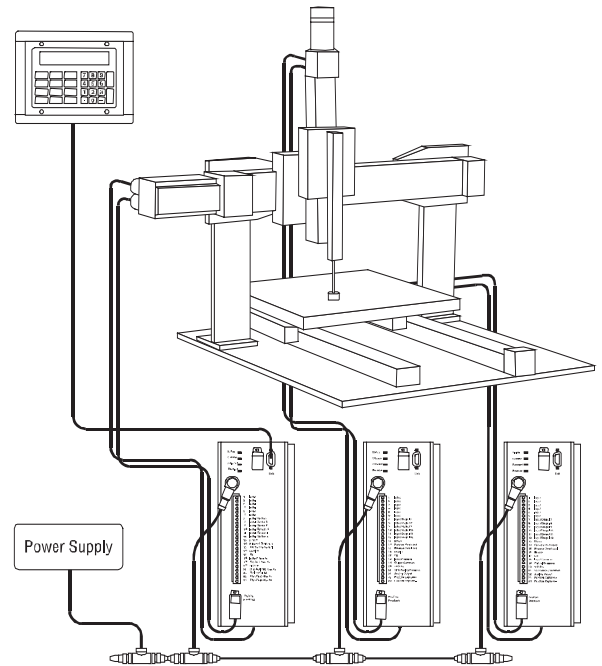
A dedicated DeviceNet port is an optional feature of the S2K controllers. The controller includes full DeviceNet implementation to facilitate the addition of motion control to industrial systems designed in a DeviceNet master/ slave or peer-to-peer control architecture.

Peer-to-peer architecture offers users a quick, economic way to create a multi-axis, stand-alone system. In a peer-to-peer or distributed control system, S2K controllers communicate directly with each other over the trunkline without having to wait their turn in the scan list, resulting in a rapid response time for inter-axis data exchange. Neither a DeviceNet master controller nor knowledge of DeviceNet communication protocol is required to use peer-to-peer communications.

Peer-to-Peer Gantry Control System

The gantry drawing shown to the right illustrates a multi-axis pick-and-place system designed with a single DeviceNet trunkline to connect devices and coordinate motion control. Utilizing DeviceNet to manage multiple axes of control in industrial automation equipment keeps point-to-point wiring and system components to a minimum.

Users can mix and match any S2K Series servo and stepping controllers from the product family on a single DeviceNet network.



Serial Communications

The S2K Motion Controller includes a multi-purpose RS232 serial port. The serial port has configurable settings for baud rate, data bits and parity and supports software flow control. A variety of commands associated with the serial port and string manipulation are provided and the port supports ASCII serial or RTU Slave protocol modes. Using the port in one mode prohibits usage in the other however, program control is provided to switch between serial port modes.

ASCII Protocol

Primarily the ASCII serial port is designed to be a programming and de-bugging interface and can be used in terminal or data modes. ASCII is the default mode of the serial port and may be used for many functions;

- Configuration and programming
- Downloading new S2K firmware
- Loading and storing programs and motion blocks
- Monitoring variable and register data via ASCII terminal or Motion Developer
- Interfacing to serial devices such as RF tag readers, digital scales, bar code readers or serial printers.

RTU Protocol

In RTU mode S2K motion controller can communicate to a Remote Terminal Unit (RTU) master, such as an HMI. The S2K RTU Slave protocol allows the RTU Master to:

- Read/Write single bits (Boolean) VB1-VB256
- Read/Write signed words (Integer) V11-VI4096
- Read/Write signed double words (DINT) VI1-VI4096
- Read/Write floating-point variables VF1-VF2047
- Read Text (String variables 128 characters each) VS1-VS144

PROFIBUS-DP

PROFIBUS is an open, vendor-independent field-bus standard for a wide range of applications in industrial automation, including motion control. The PROFIBUS specification defines the technical characteristics of a serial field bus system that links distributed digital controllers on the network, from field level to cell level. It is a multi-master system that allows the joint operation of several automation, engineering or visualization systems with their distributed peripherals on one bus. The S2K is available as a Profibus DP slave device and uses the Profibus profile's Type 2 Octet-String 20 — the 20-byte data string.

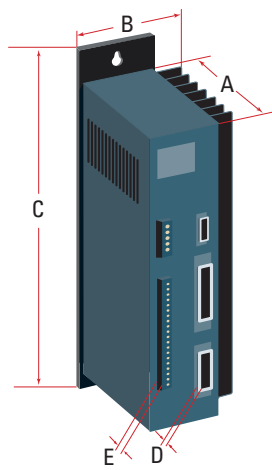
Slave devices do not have bus access rights and can acknowledge receipt of messages or send messages to the master upon request. A PROFIBUS-DP network may have up to 127 stations with up to 32 stations per bus segment. The S2K controllers accommodate station addresses 0 - 99 and communicate via cyclic data transfer, the process by which data and parameters are transferred between master and slave. The master can also initiate global commands (multicast and broadcast) when event-controlled synchronization of the slaves is required. The S2K Motion Controller supports global messages such as clear data, auto baud, freeze/unfreeze and sync/unsync.

S2K Series

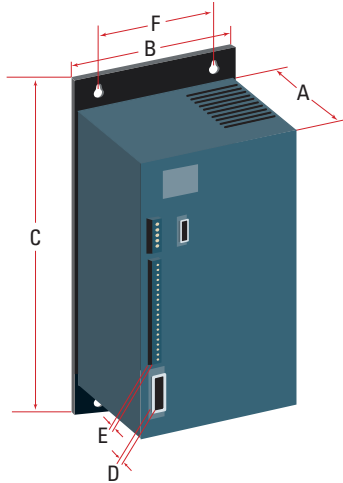
Mechanical Dimensions

Dimension	Feature	STI105	SSI107	SSI216	SSI407	SSI420
		SSI104		SSI228		
n/a	Weight lb (kg)	4.0 (1.8)	7.0 (3.18)	13 (5.9)	6.0 (2.7)	14 (6.4)
A	Depth in (mm)	6.05 (153.7)	8.15 (207.0)	10.15 (257.8)	8.15 (207)	10.15 (258)
B	Width in (mm)	3.20 (81.3)	3.45 (87.6)	5.25 (133.4)	4.35 (110.5)	5.25 (133.4)
C	Height in (mm)	8.50 (215.9)	8.50 (215.9)	12.20 (309.9)	8.50 (215.9)	12.20 (309.9)
D	Position Feedback Connector Depth in (mm)	2.7 (68.6)	2.7 (68.6)	2.7 (68.6)	1.26 (32)	1.26 (32)
E	User I/O Connector Depth in (mm)	0.75 (19.1)	0.75 (19.1)	0.75 (19.1)	0.75 (19.1)	0.75 (19.1)
F	Center to center spacing between adjacent mounting holes	n/a	n/a	3.66 (92.96)	n/a	3.66 (92.96)

S2K Series Servo and Stepping Motor Controllers



STI105, SSI104, SSI107, SSI407

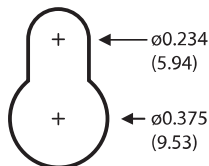


SSI216, SSI228, SSI420

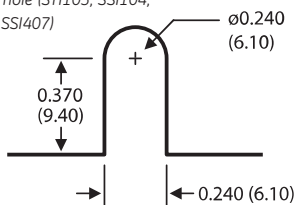
Mounting hole dimensions in (mm)

Top hole (all models)

Bottom hole (SSI216,
SSI228, SSI420)



Bottom hole (STI105, SSI104,
SSI107, SSI407)



Motion Solutions

Motion Controllers

S2K Series

Ratings and Ordering Information

Stepper Models

IC800STI105D2	5 Amp, 115/230 VAC S2K Stepper Controller, Encoder Feedback, DeviceNet
IC800STI105P2	5 Amp, 115/230 VAC S2K Stepper Controller, Encoder Feedback, Profibus
IC800STI105S1	5 Amp, 115/230 VAC S2K Stepper Controller, Encoder Feedback, Extended I/O

Servo Models for MTR-Series Motors (Resolver Feedback)

IC800SSI104RD2	4.3 Amp, 115/230 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI104RP2	4.3 Amp, 115/230 VAC S2K Controller, Resolver Feedback, Profibus
IC800SSI104RS1	4.3 Amp, 115/230 VAC S2K Controller, Resolver Feedback, Extended I/O

IC800SSI107RD2	7.2 Amp 115/230 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI107RP2	7.2 Amp 115/230 VAC S2K Controller, Resolver Feedback, Profibus
IC800SSI107RS1	7.2 Amp 115/230 VAC S2K Controller, Resolver Feedback, Extended I/O

IC800SSI216RD2	16 Amp, 230 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI216RP2	16 Amp, 230 VAC S2K Controller, Resolver Feedback, Profibus

IC800SSI228RD2	28 Amp, 230 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI228RP2	28 Amp, 230 VAC S2K Controller, Resolver Feedback, Profibus

IC800SSI407RD2	7.2 Amp, 460 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI407RP2	7.2 Amp, 460 VAC S2K Controller, Resolver Feedback, Profibus
IC800SSI407RS1	7.2 Amp 460 VAC S2K Controller, Resolver Feedback, Extended I/O

IC800SSI420RD2	20 Amp, 460 VAC S2K Controller, Resolver Feedback, DeviceNet
IC800SSI420RP2	20 Amp, 460 VAC S2K Controller, Resolver Feedback, Profibus

Servo Models for S-Series Motors (Serial Encoder Feedback)

IC800SSI104D2	4.3 Amp, 115/230 VAC S2K Controller, Encoder Feedback, DeviceNet
IC800SSI104P2	4.3 Amp, 115/230 VAC S2K Controller, Encoder Feedback, Profibus
IC800SSI104S1	4.3 Amp, 115/230 VAC S2K Controller, Encoder Feedback, Extended I/O

IC800SSI107D2	7.2 Amp 115/230 VAC S2K Controller, Encoder Feedback, DeviceNet
IC800SSI107P2	7.2 Amp 115/230 VAC S2K Controller, Encoder Feedback, Profibus
IC800SSI107S1	7.2 Amp 115/230 VAC S2K Controller, Encoder Feedback, Extended I/O

IC800SSI216D2	16 Amp, 230 VAC S2K Controller, Encoder Feedback, DeviceNet
IC800SSI216P2	16 Amp, 230 VAC S2K Controller, Encoder Feedback, Profibus

IC800SSI228D2	28 Amp, 230 VAC S2K Controller, Encoder Feedback, DeviceNet
IC800SSI228P2	28 Amp, 230 VAC S2K Controller, Encoder Feedback, Profibus

Accessories

73006589	Hand Held I/O Simulator for 4.3 and 7.2A Models
IC800SLR001	50Ω, 100W External Regeneration Resistor Kit
IC800SLR002	100Ω, 225W External Regeneration Resistor Kit
IC800SLR003	20Ω, 300W External Regeneration Resistor Kit
IC800SLR004	15Ω, 1000W External Regeneration Resistor Kit
TRM-JAUX-03	S2K Auxiliary I/O Breakout Terminal Board, 3 ft cable*
TRM-JAUX-10	S2K Auxiliary I/O Breakout Terminal Board, 10 ft cable*
IC800MBUSADP	RS232 to 422/485 Serial Converter for Modbus RTU Communications

*Required for Encoder feedback to S2K stepper controller when using CBL-13-ET or CBL-14-ET encoder cable.

Cables

Cables in several lengths are available from GE Fanuc for motor to amplifier connections and various other amplifier functions. It is strongly recommended that you use the cables available from GE Fanuc as shown below. GE Fanuc does not ship mating power or feedback connectors for the MTR-Series Motors or S-Series Motors with the motor. See appropriate motor section of this catalog for motor connector information.

S2K Series Cable	GE Fanuc Catalog Number	Description
Aux. I/O Interface	IC800SKClxxx	Interface Cable, S2K Auxiliary I/O to 44A726268-001 Terminal Board Assembly, 1 m or 3 m
	IC800SKCFLYxxx	Interface Cable, S2K Auxiliary I/O connector to Flying Leads, 1 m or 3 m
Serial	IC800SKCS030	S2K Serial Communication Cable for PC (Motion Developer) Interface, 3 m
S-Series Servo Motor Encoder	IC800SKCEZxxx	Encoder Cable, S2K to 30-750 W S-Series Motor, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Power	IC800SKCEVxxx	Encoder Cable, S2K to 1 kW-5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKCPZxxx	Power Cable, S2K to 30-750 W S-Series Motor, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Brake (30-750 W Motors only)	IC800SKCPVxxx	Power Cable, S2K to 1kW-2.5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKCPLxxx	Power Cable, S2K to 3.5 kW-5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKCBVxxx*	Power/Brake Cable, 1 kW-2.5 kW S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
	IC800SKCBVLxxx*	Power/Brake Cable, 3.5 kW-5 kW S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Brake (30-750 W Motors only)	IC800SLCBZ0xxx	Brake Cable, 30-750 W S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
MTR-Series Motor Resolver**	CBL-3T-RD-xx	Resolver Cable, S2K to MTR-3T Series Servo Motor, xx=10, 20 or 30 feet
MTR-Series Motor Power**	CBL-3T-MP-xx	Power Cable, S2K to MTR-3T5x and 3T6x Servo Motors, xx=10, 20 or 30 feet
MTR-Series Motor Brake	CBL-T7-MB-xx	Power Cable, S2K to MTR-3T1x, 3T2x and 3T4x Servo Motors, xx=10, 20 or 30 feet
MTR-Series Motor Brake	CBL-3T-MB-xx	Power/Brake Cable, S2K to MTR-3T5x and 3T6x Servo Motors with Brake, xx=10, 20 or 30 feet
MTR-Series Motor Brake	CBL-T7-MB-xx	Power/Brake Cable, S2K to MTR-3T1x, 3T2x and 3T4x Servo Motors with Brake, xx=10, 20 or 30 feet
Commutating Encoder	CBL-3C-L1D-FLY-XX	Encoder cable, S2K to flying leads for connection of quadrature encoder with hall tracks, xx=10, 20 or 30 feet.

*The 1 kW-5 kW S-Series servo motors incorporate the brake power and motor power into a single cable. When a brake is required this cable should be used in place of the motor power cable IC800SKCPVxxx or IC800SKCPLxxx. The 30-750 W S-Series servo motors require a separate cable (IC800SLCBZxxx) for motor brake power when the brake option is required.

**For stepper motor cables, see Stepping Motor Cable and Amplifier Compatibility section of this catalog.

Servo Amplifiers

For systems using an APM300, DSM300 or third-party motion controller or where only speed or torque control are required, GE Fanuc offers the S2K and SL Series Servo Amplifiers. These servos cover a wide torque range and offer high servo response to meet your most demanding application requirements. All S2K and SL Series Amplifiers accept analog speed or torque commands in addition to pulse command input for stepper replacement systems.



S2K Series Servos

The S2K Series brushless servos offer the following features:

- 0.84-477 in-lb (0.095-53.9 Nm) continuous stall torque range
- Auto tuning
- ± 10 VDC analog torque/velocity command, pulse/direction or cw/ccw pulse command input
- 122 μ s servo loop update rate for fast servo response and improved accuracy
- UL, cUL and CE registration pending
- Serial encoder interface to GE Fanuc S-Series motors or resolver interface to MTR-Series motors
- Models available for 115, 230 and 460 VAC supply
- Electronic gearing mode with user defined ratio

SL Series Servos

The SL Series brushless servos offer the following features:

- 0.84-322 in-lb (0.095-36.3 Nm) continuous stall torque range
- NEMA motor mounting on 30-1000 W motors; metric mounting on 1-5kW motors
- Auto tuning
- ± 10 VDC analog torque/velocity command, pulse/direction or cw/ccw pulse command input
- 41 to 87 μ s loop update depending on rating
- Six character display and integral keypad for quick configuration changes without a PC
- On-the-fly servo gain switching to optimize performance with large load variations
- UL, cUL and CE on most models
- Serial encoder interface to GE Fanuc S-Series Motors



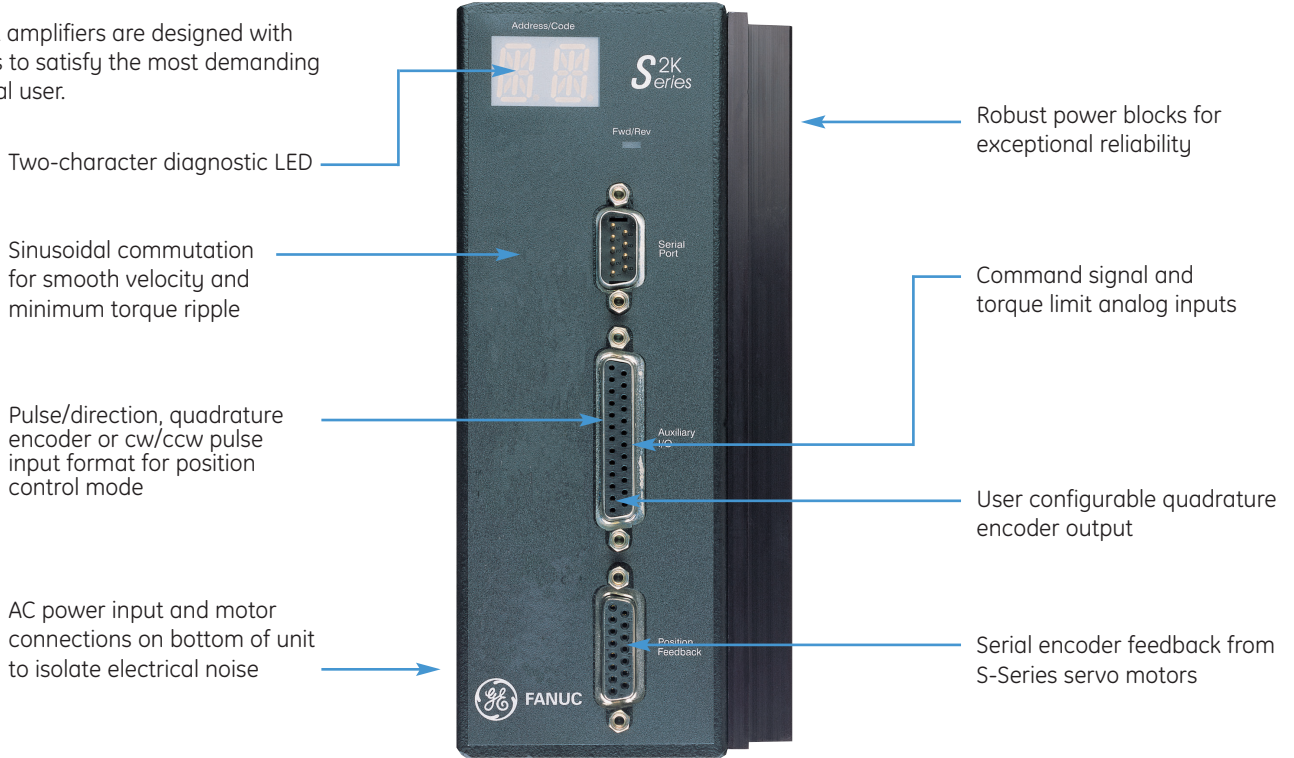
Applications

- Packaging machines
- Labeling machines
- Bag making machines
- Assembly
- Pick and place
- Flying cutoff
- Rotary tables
- Feed/cut to length
- Electronic line shafting
- Random infeed
- and many more

Servo Amplifiers

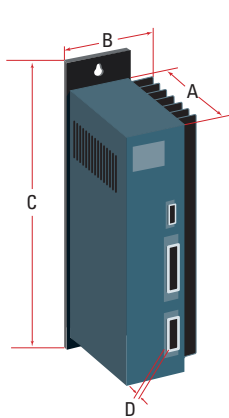
S2K Series Servo Amplifiers

The S2K amplifiers are designed with features to satisfy the most demanding industrial user.

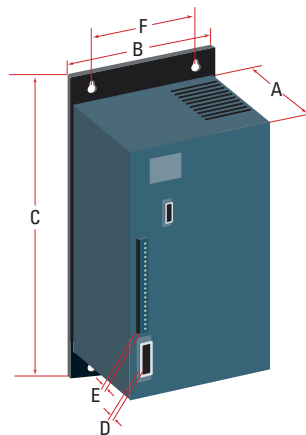


Mechanical Dimensions

Dimension	Feature	SSD216				
		SSD104	SSD107	SSD228	SSD407	SSD420
n/a	Weight lb (kg)	3.6 (1.64)	6.5 (2.95)	13 (5.9)	6.0 (2.7)	14 (6.4)
A	Depth in (mm)	6.05 (153.7)	8.15 (207)	10.15 (258)	8.15 (207)	10.15 (258)
B	Width in (mm)	3.20 (81.3)	3.45 (87.6)	5.25 (133.4)	4.35 (110.5)	5.25 (133.4)
C	Height in (mm)	8.50 (215.9)	8.50 (215.9)	12.20 (309.9)	8.50 (215.9)	12.20 (309.9)
D	Position Feedback Connector Depth in (mm)	1.26 (32)	1.26 (32)	1.26 (32)	1.26 (32)	1.26 (32)
E	User I/O Connector Depth in (mm)	n/a	n/a	0.75 (19)	n/a	0.75 (19)
F	Center to center spacing between adjacent mounting holes	n/a	n/a	3.66 (92.96)	n/a	3.66 (92.96)



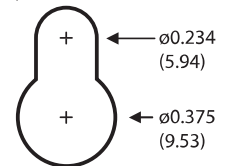
SSD104, SSD107, SSD407



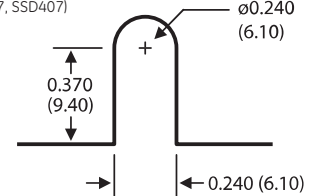
SSD216, SSD228, SSD420

Mounting hole dimensions in (mm)

Top hole (all models)
Bottom hole (SSD216, SSD228, SSD420)



Bottom hole (SSD104, SSD107, SSD407)



Servo Amplifiers

S2K Series Servo Amplifiers

Electrical Specifications

Power Specifications

Specifications	Units	SSD104	SSD107	SSD216	SSD228	SSD407	SSD420
AC Input Voltage Range	VAC	90-250, 1 or 3 phase		180-250, 3 phase		324-528, 3 phase	
AC Input Frequency Range	Hz	50-440					
PWM Frequency to Motor	kHz	16.4					
Min. Motor Inductance	mH	1 (per phase)					
Cont. Output Current	A _{rms}	4.3	7.2	16	28	7.2	20
Peak Output Current	A _{rms}	8.6	14.4	32	56	10.8	20
Max. Input Current 1-phase	A _{rms}	7	15	n/a	n/a	n/a	n/a
3-phase	A _{rms}	4	8	18	30	8	22
Max. Input Power	KVA @ Rated VAC	1.6	3.8	8.5	14.3	6.4	18
Logic Input Power	VAC	n/a	n/a	90-250 @ 0.5 A		+18-30 VDC @ 1.5 A	
DC Power Outputs	VDC	+5 @ 0.25 A; +12 @ 0.5 A					

Analog Command Inputs

Operating Range	±10 VDC
Resolution	12 Bits
Input Impedance	50 kΩ
Output Current	5 mA

Pulse Command/Auxiliary Encoder Input

Input Format	single-ended or differential; quadrature, pulse/direction or cw/ccw; square or sine wave
Input Voltage Range	+5 to +15 VDC
Line Count Frequency	3 MHz maximum
Pulse Frequency	12 MHz maximum with 4X multiplier

Differential Encoder Output*

Output Format	differential; squarewave; quadrature, pulse/direction, cw/ccw pulse
Output Voltage	+5 VDC
Line Count Frequency	3 MHz maximum
Pulse Frequency	12 MHz maximum with 4X multiplier

Motor Encoder Input (S-Series Motors only)

Input Format	quadrature encoder with serial commutation channel
Input Voltage Range	+5 to +15 VDC
Line Count Frequency	2 MHz maximum
Pulse Frequency	8 MHz maximum with 4X multiplier

Motor Resolver Feedback Input (Resolver-based models only)

Number Available	1
Resolution	4096 pulses per revolution
Maximum Speed	15,000 RPM
Type	Control Transmitter
Phase Shift	±5.0 degrees @ 5kHz
Null Voltage	< 20 mV @ 5kHz
Transformation Ratio	0.5

Analog Output

Operating Range	±10 VDC
Resolution	8 Bits
Input Impedance	50 kΩ
Output Current	5 mA

RS-232 Serial Communication

Available	1
Functions Supported	multipurpose programming port
Maximum Addressable Units	1
Communication Rate	9,600 baud
Maximum Distance of RS-232	50 feet
Flow Control	XON / XOFF

Environmental Specifications

Operating Temperature, Free Air Ambient**	
SSD104, SSD105, SSD107	32 to 122°F (0 to 50°C)
SSD216, SSD228, SSD407, SSD420	32 to 104°F (0 to 40°C)

Storage and Shipping Temperature -40 to 176°F (-40 to 80°C)

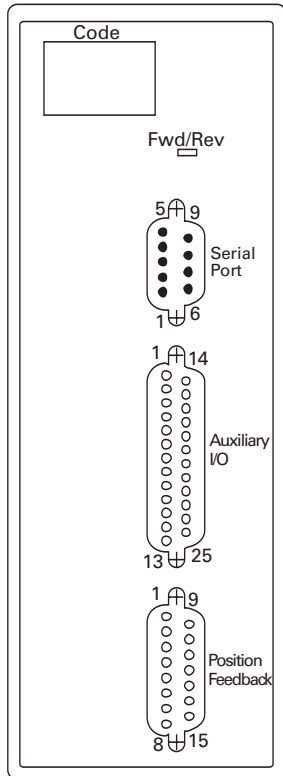
Enclosure Type open

* Encoder output provides a 1:1 buffer of the auxiliary encoder input. In servo systems, this output can be alternately configured as the motor position output with selectable resolution.

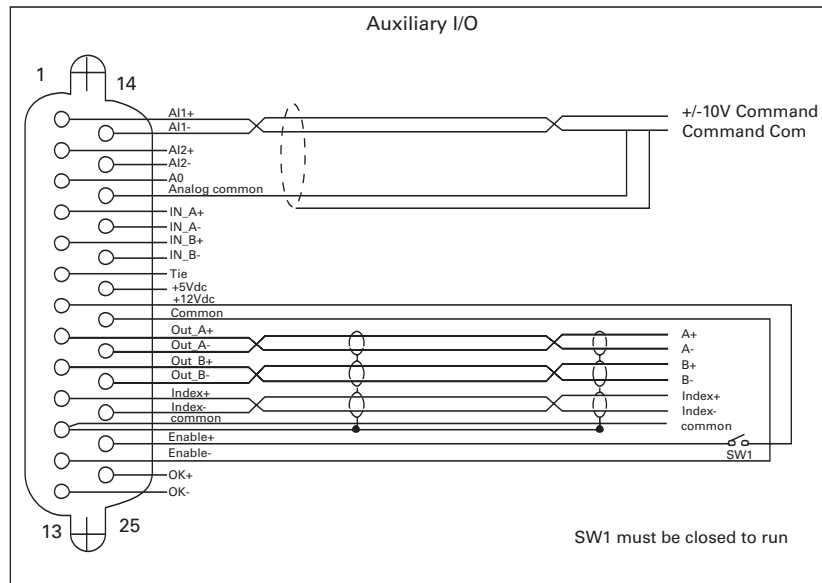
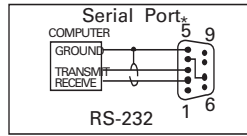
** Assumes heatsink in vertical orientation.

S2K Series Servo Amplifiers

Connection Diagrams S2K Model: SSD104

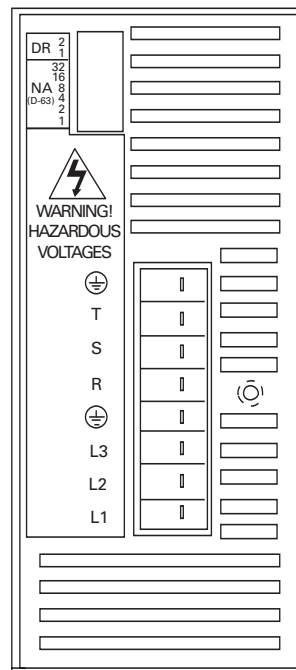


FRONT VIEW

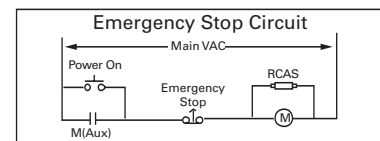
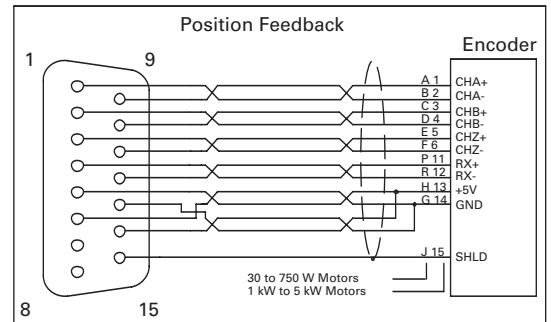
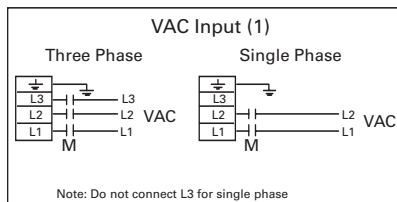
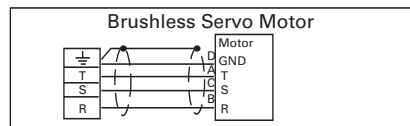
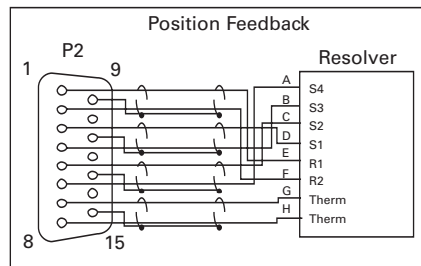


***Note:**

The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.



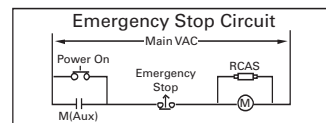
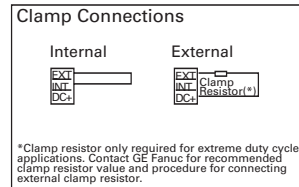
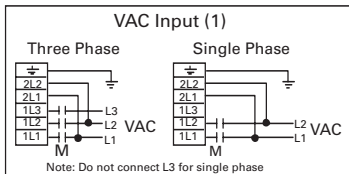
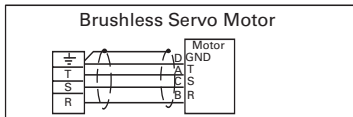
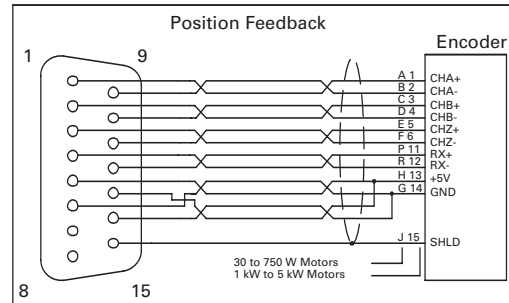
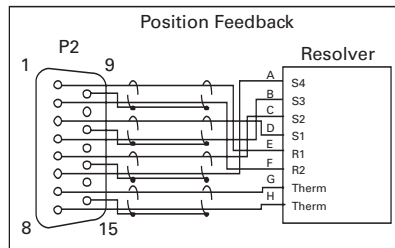
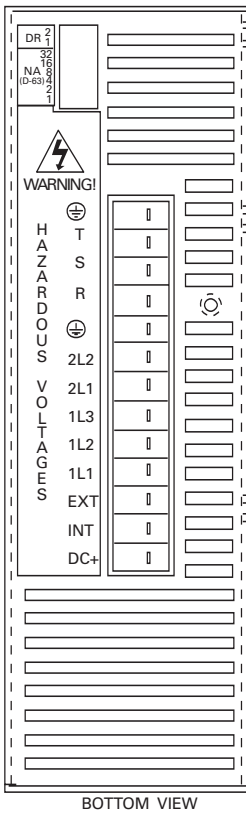
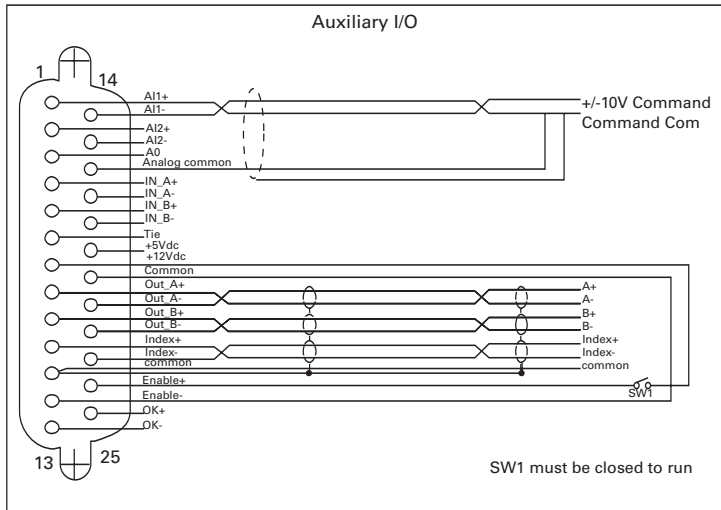
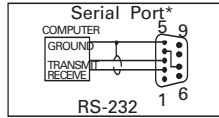
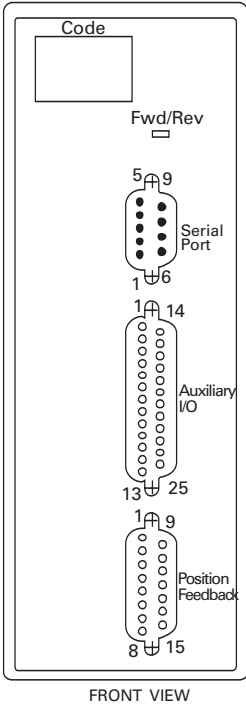
BOTTOM VIEW



REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 10 Amps, 3 phase @ 6 Amps

S2K Series Servo Amplifiers

Connection Diagrams S2K Model: SSD107



REMARKS:
(1) Input power 90 to 250 VAC, 50-440 Hz
1 phase @ 15 Amps, 3 phase @ 8 Amps

***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

Servo Amplifiers

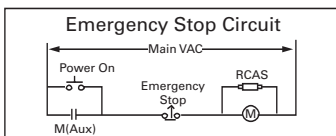
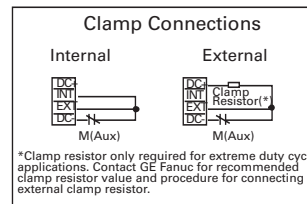
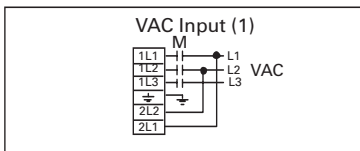
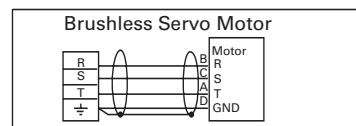
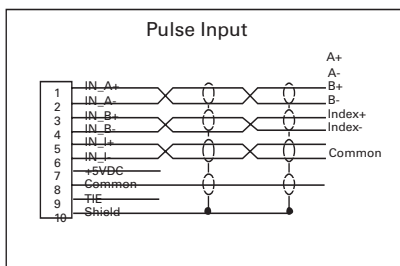
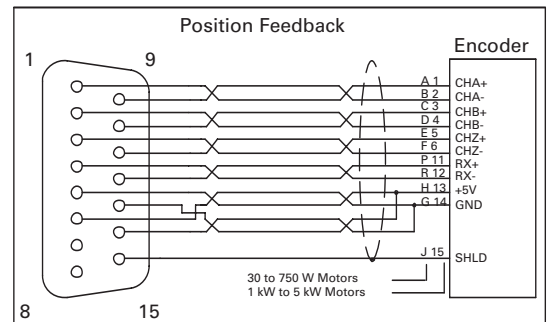
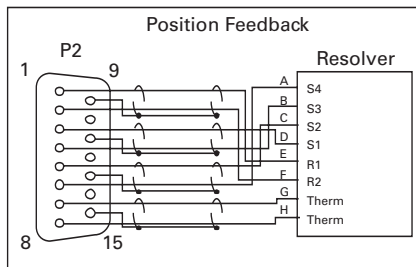
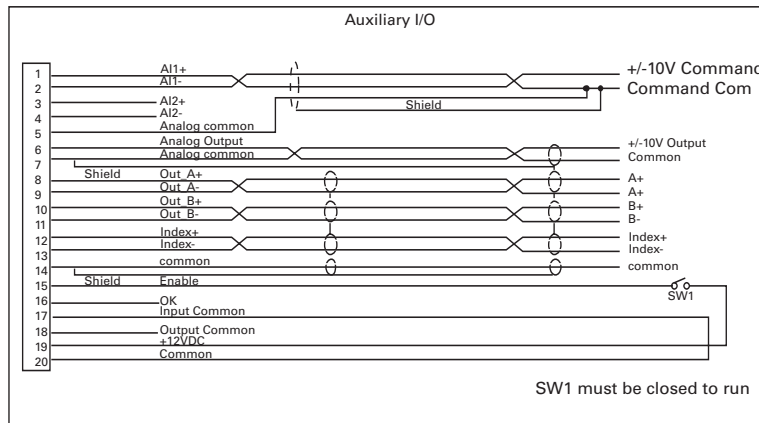
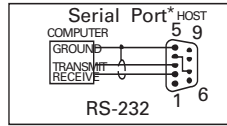
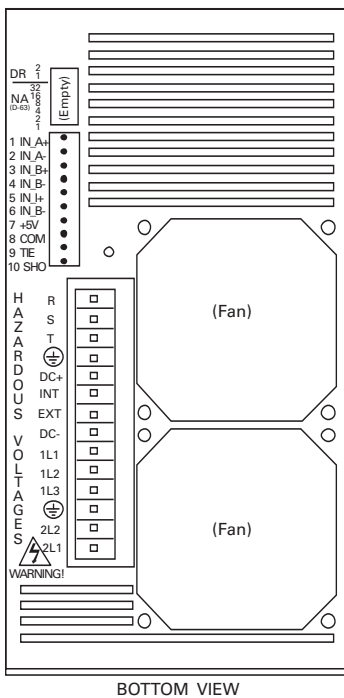
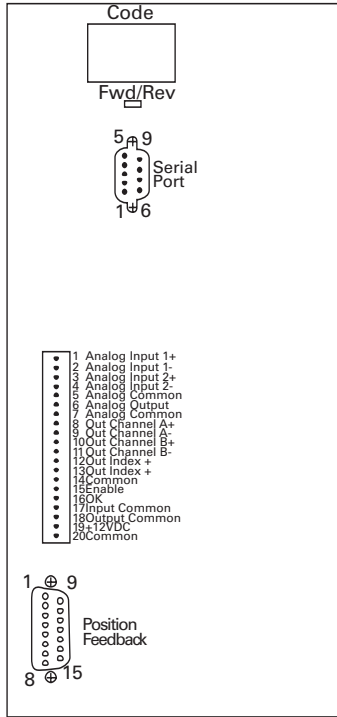
S2K Series Servo Amplifiers

Connection Diagrams

S2K Model: SSD216 and SSD228

***Note:**

The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

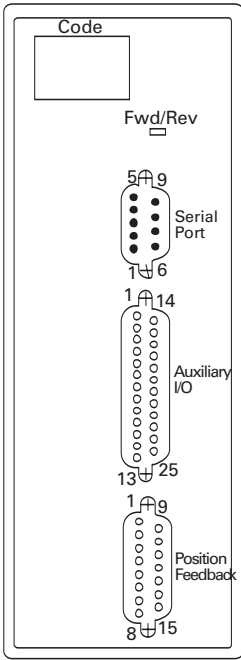


REMARKS:

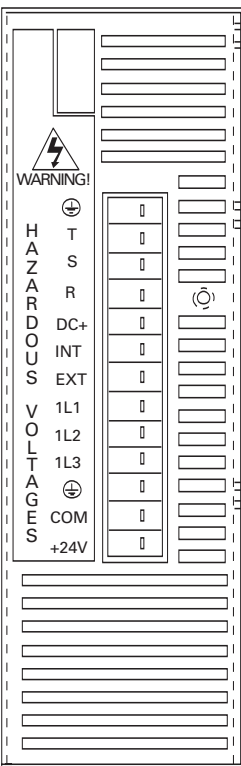
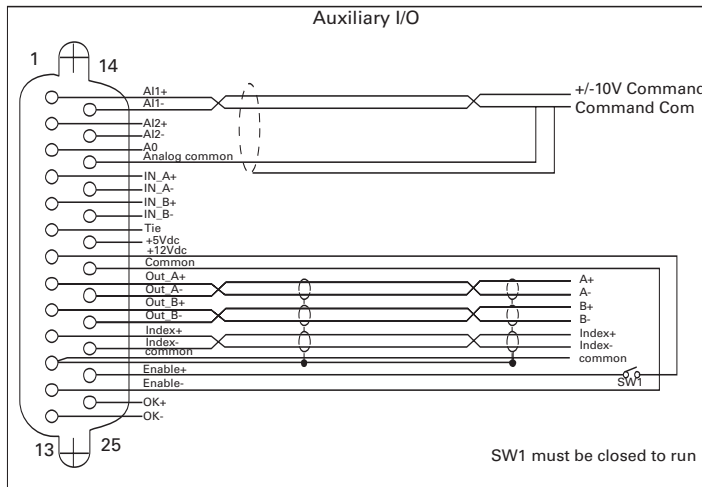
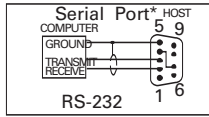
- (1) Input power 180 to 250 VAC
- 3 phase 50-440 Hz @ 18 Amps for IC800SSD216S1A
- 3 phase 50-440 Hz @ 30 Amps for IC800SSD228S1A

S2K Series Servo Amplifiers

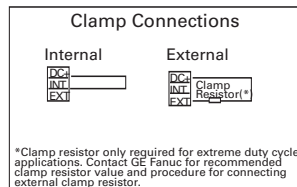
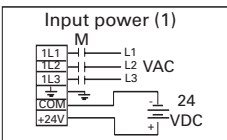
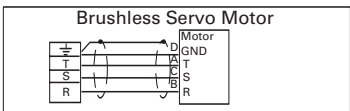
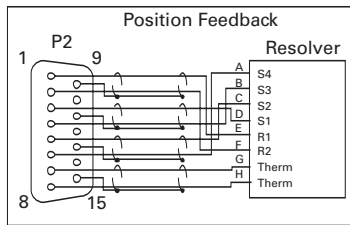
Connection Diagrams
S2K Model: SSD407



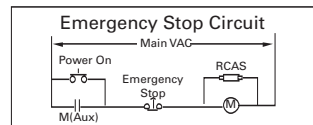
FRONT VIEW



BOTTOM VIEW



*Clamp resistor only required for extreme duty cycle applications. Contact GE Fanuc for recommended clamp resistor value and procedure for connecting external clamp resistor.



REMARKS:
(1) Input motor power 324 to 528 VAC
3 phase 50-440 Hz @ 8 Amps
Input logic power 18 to 30 VDC @ 2 Amps

***Note:**
The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.

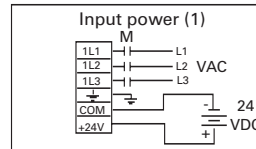
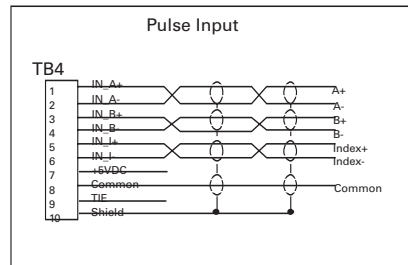
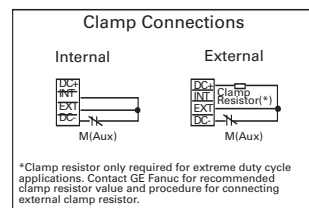
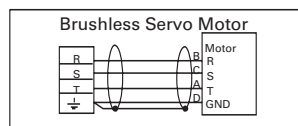
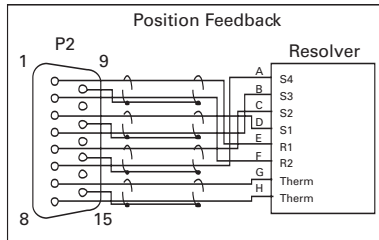
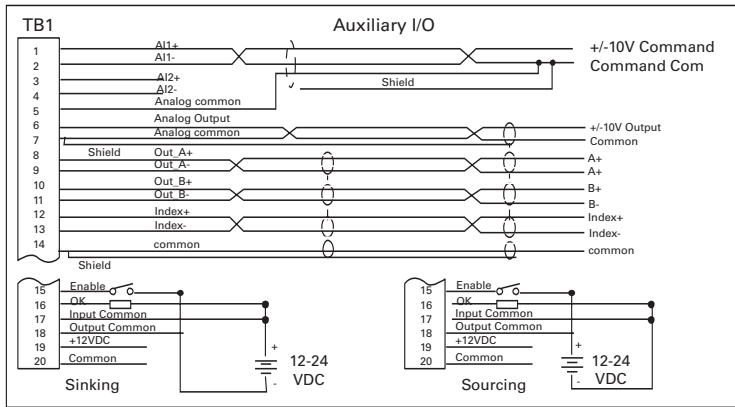
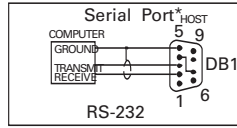
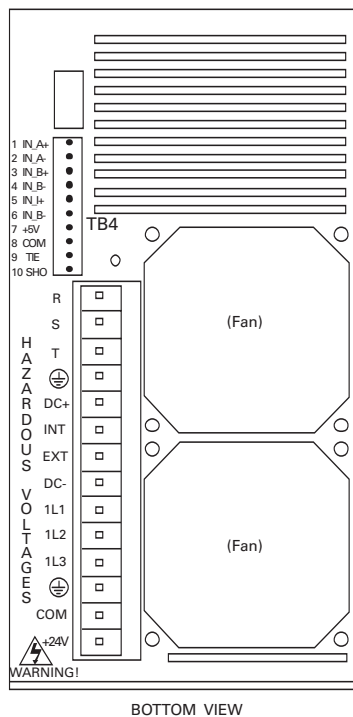
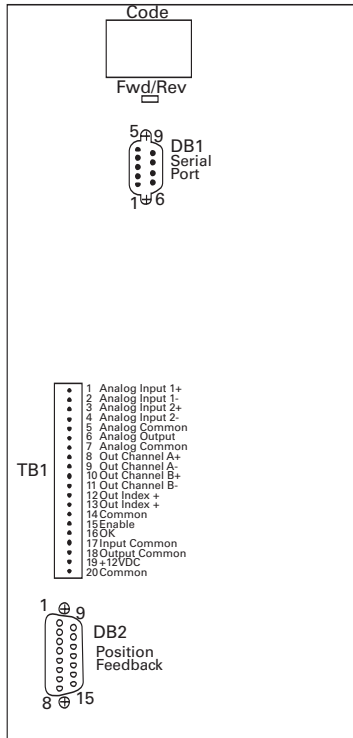
Servo Amplifiers

S2K Series Servo Amplifiers

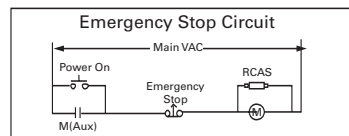
Connection Diagrams S2K Model: SSD420

***Note:**

The S2K serial port includes 12 V on pin 4. A jumper must be placed from pin 4 to pin 7 to prevent possible damage to serial port on some computers. Using a GE Fanuc serial communication cable is recommended.



REMARKS:
 (1) Input motor power 324 to 528 VAC
 3 phase 50-440 Hz @ 8 Amps
 Input logic power 18 to 30 VDC @ 2 Amps



Servo Amplifiers

S2K Series Servo Amplifiers

Ratings and Ordering Information

Servo Models for MTR-Series Motors (Resolver Feedback)

IC800SSD104RS1	4.3 Amp, 115/230 VAC S2K Amplifier, Resolver Feedback
IC800SSD107RS1	7.2 Amp, 115/230 VAC S2K Amplifier, Resolver Feedback
IC800SSD216RS1	16 Amp, 230 VAC S2K Amplifier, Resolver Feedback
IC800SSD228RS1	28 Amp, 230 VAC S2K Amplifier, Resolver Feedback
IC800SSD407RS1	7.2 Amp, 460 VAC S2K Amplifier, Resolver Feedback
IC800SSD420RS1	20 Amp, 460 VAC S2K Amplifier, Resolver Feedback

Accessories

IC800SLR001	50Ω, 100W External Regeneration Resistor Kit
IC800SLR002	100Ω, 225W External Regeneration Resistor Kit
IC800SLR003	20Ω, 300W External Regeneration Resistor Kit
IC800SLR004	15Ω, 1000W External Regeneration Resistor Kit
TRM-JAUX-03	S2K Auxiliary I/O Breakout Terminal Board, 3 ft cable
TRM-JAUX-10	S2K Auxiliary I/O Breakout Terminal Board, 10 ft cable

Servo Models for S-Series Motors (Serial Encoder Feedback)

IC800SSD104S1	4.3 Amp, 115/230 VAC S2K Amplifier, Serial Encoder Feedback
IC800SSD107S1	7.2 Amp, 115/230 VAC S2K Amplifier, Serial Encoder Feedback
IC800SSD216S1	16 Amp, 230 VAC S2K Amplifier, Serial Encoder Feedback
IC800SSD228S1	28 Amp, 230 VAC S2K Amplifier, Serial Encoder Feedback

Cables

Cables in several lengths are available from GE Fanuc for motor to amplifier connections and various other amplifier functions. It is strongly recommended that you use the cables available from GE Fanuc as shown below. GE Fanuc does not ship mating power or feedback connectors for the MTR-Series Motors or S-Series Motors with the motor. See appropriate motor section of this catalog for motor connector information.

S2K Series Cable	GE Fanuc Part Number	Description
Auxiliary I/O Interface	IC800SKClxxx	Interface Cable, S2K Auxiliary I/O to 44A726268-001 Terminal Board Assembly, 1 m or 3 m
	IC800SKFLYxxx	Interface Cable, S2K Auxiliary I/O connector to Flying Leads, 1 m or 3 m
Serial	IC800SKCS030	S2K Serial Communication Cable for PC (Motion Developer) Interface, 3 m
S-Series Servo Motor Encoder	IC800SKCEZxxx	Encoder Cable, S2K to 30-750 W S-Series Motor, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Power	IC800SKCVxxx	Encoder Cable, S2K to 1 kW-5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Power	IC800SKCPZxxx	Power Cable, S2K to 30-750 W S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKCPVxxx	Power Cable, S2K to 1 kW-2.5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKPVLxxx	Power Cable, S2K to 3.5 kW-5 kW S-Series Motor, xxx=050 (5 m) or 100 (10 m)
	IC800SKCBVxxx*	Power/Brake Cable, 1 kW-2.5 kW S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
S-Series Servo Motor Brake (30-750 W Motors only)	IC800SKCBLxxx*	Power/Brake Cable, 3.5 kW-5 kW S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
	IC800SLCBZ0xxx	Brake Cable, 30-750 W S-Series Motor with Brake, xxx=050 (5 m) or 100 (10 m)
MTR-Series Motor Resolver	CBL-3T-RD-xx	Resolver Cable, S2K to MTR-3T Series Servo Motor, xx=10, 20 or 30 feet
MTR-Series Motor Power	CBL-3T-MP-xx	Power Cable, S2K to MTR-3T5x and 3T6x Servo Motor, xx=10, 20 or 30 feet
MTR-Series Motor Power	CBL-T7-MP-xx	Power Cable, S2K to MTR-3T1x, 3T2x and 3T4x Servo Motor, xx=10, 20 or 30 feet
MTR-Series Motor Brake	CBL-3T-MB-xx	Power/Brake Cable, S2K to MTR-3T5x and 3T6x Servo Motor with Brake, xx=10, 20 or 30 feet
MTR-Series Motor Brake	CBL-T7-MB-xx	Power/Brake Cable, S2K to MTR-3T1x, 3T2x and 3T4x Servo Motor with Brake, xx=10, 20 or 30 feet

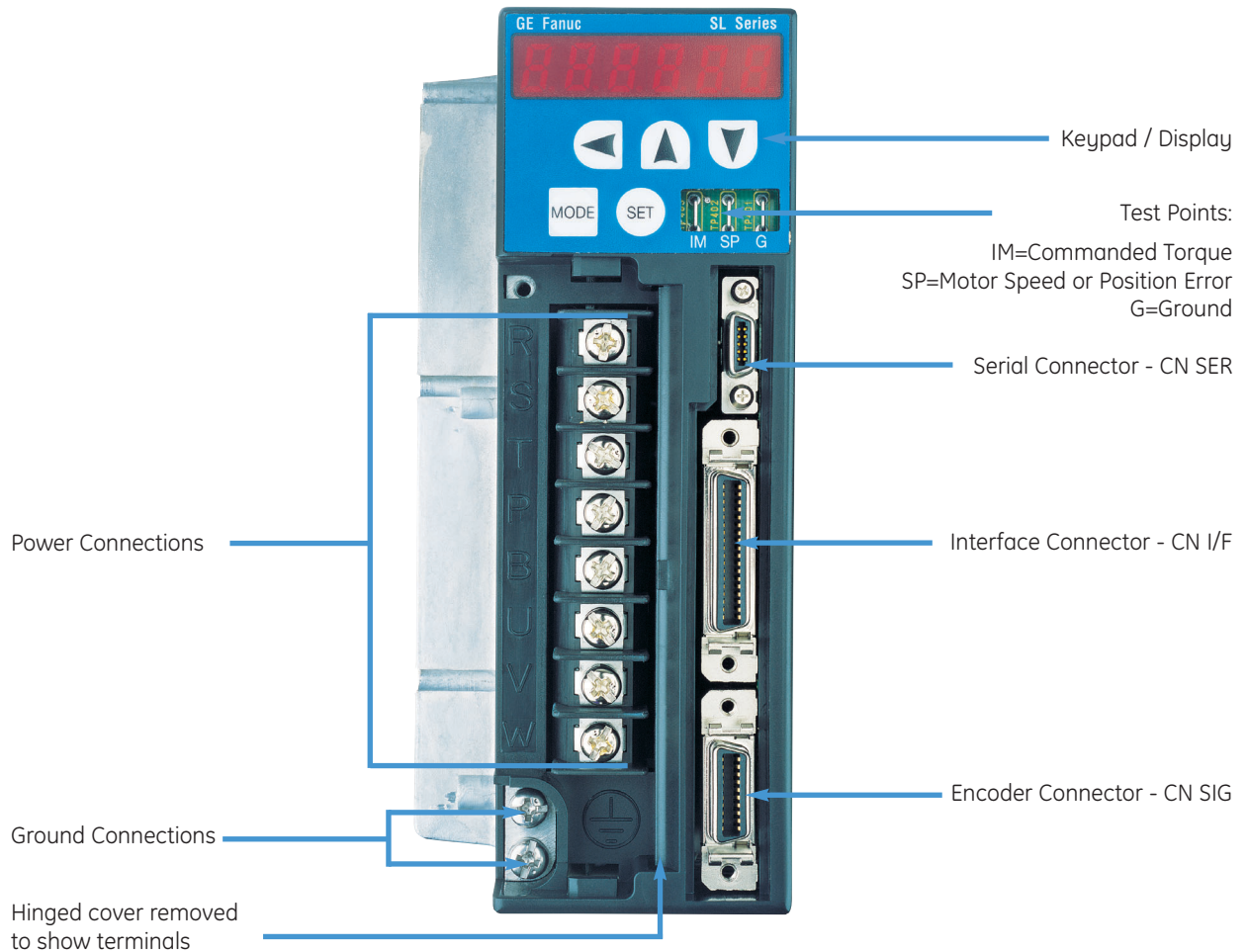
*The 1 kW-5 kW S-Series servo motors incorporate the brake power and motor power into a single cable. When a brake is required this cable should be used in place of the motor power cable IC800SKCPVxxx or IC800SKPVLxxx. The 30-750 W S-Series servo motors require a separate cable (IC800SLCBZ0xxx) for motor brake power when the brake option is required.

SL Series Servo Amplifier Features

The SL Series servo family is comprised of the Z-Series and the V-Series components. The Z-Series amplifiers cover servos from 30 Watt to 750 Watt continuous rating. The V-Series covers servos from 1,000 Watt to 5,000 Watt continuous rating. While many of the functions

and configuration parameters are the same for both series, there are a number of differences. One of the primary differences is the I/O configuration on the CN I/F interface connector of the amplifier. The V-Series uses a 50-pin interface connector and contains several signals not

included on the Z-Series amplifiers. The Z-Series amplifiers use a 36-pin interface connector and use parameter configurations to assign different I/O functions to some of the connector pins.



Servo Amplifiers

SL Series Servo Amplifier Specifications

Z-Series Amplifier Specifications

Specification	Units	Amplifier Rating @ 20°C					
		30 W	50 W	100 W	200 W	400 W	750 W
Model Number	x = Bus Power Supply, see below	SLA003x	SLA005x	SLA010x	SLA020x	SLA040x	SLA075x
Continuous Current	A_{rms} (115 VAC Model)	1.0	1.0	1.6	2.5	4.4	n/a
	A_{rms} (230 VAC Model)	1.0	1.0	1.0	1.6	2.5	4.3
Peak Current	A_{0-p} (115 VAC Model)	4.3	4.3	6.9	10.5	18.3	n/a
	A_{0-p} (230 VAC Model)	4.3	4.3	4.3	6.9	10.5	18.3
Bus Power Supply	x=1 (115 VAC Model)	Single Phase 85 – 126 VAC, 50/60 Hz					
	x=2 (230 VAC Model)	170 – 253 VAC, 50/60 Hz, Single* or Three Phase					
I/O Power Supply†	Voltage	12 to 24 VDC ± 10%					
	Current	200 mA					
Loop Update Time	Position Loop	0.25 ms					
	Velocity Loop	0.25 ms					
	Current Loop	0.0417 ms				0.0833 ms	
Command Input Filter Time Constant	Pulse Command	1 µs					
	Velocity Command	50 µs					
	Torque Command	50 µs					
Weight	lb [kg] (115 VAC Model)	1.98 [0.9]	1.98 [0.9]	1.98 [0.9]	2.2 [1.0]	2.64 [1.2]	n/a
	lb [kg] (230 VAC Model)	1.98 [0.9]	1.98 [0.9]	1.98 [0.9]	1.98 [0.9]	2.2 [1.0]	2.64 [1.2]
External Regenerative Resistor Specifications	Turn On Voltage	115 VAC Models: 195 VDC 230 VAC Models: 380 VDC					
	Peak Power @ Min. Resistance	1280 W	1280 W	1280 W	1280 W	2800 W	9216 W
	Min. Resistance (115 VAC Model)	20 Ω	20 Ω	20 Ω	20 Ω	16 Ω	n/a
	Min. Resistance (230 VAC Model)	47 Ω	47 Ω	47 Ω	47 Ω	32 Ω	16 Ω
	Maximum Current (A_{0-p})	8 A	8 A	8 A	8 A	12 A	24 A

* Single-phase operation of 230 VAC models rated 200 W and larger require derating of the motor torque by 2.5% per °C above 40°C up to 50°C maximum.

† The SL Series amplifiers require a DC power supply for I/O power. One of the GE Fanuc 24 VDC power supplies, part numbers IC690PWR024 (5 Amp) or IC690PWR124 (10 Amp), is recommended. The same external DC power supply can be used to provide power to multiple amplifiers as long as the supply is rated for the total power drawn by all of the amplifiers.

Z-Series Amplifier Environmental Specifications

Relative Humidity	90% noncondensing
Altitude	3300 feet (1000 m)
Ambient Temperature	0 to 50°C operating
Storage Temperature	-20 to 80°C
Shock	15 G nonoperating
Vibration	15 G @ 10-150 Hz

Servo Amplifiers

SL Series Servo Amplifier Specifications

V-Series Amplifier Specifications

Specification	Units	Amplifier Rating @ 20°C			
		1000 W	2500 W	3500 W	5000 W
Model Number		SLA1002	SLA2502	SLA3502	SLA5002
Continuous Current	A_{rms}	7.2	15.9	21.6	28.5
Peak Current	A_{0-p}	30	68	92	120
Bus Power Supply	VAC	170 – 253 VAC, 50/60 Hz, Single* or Three Phase			
Control Power Supply	VAC	170 – 253 VAC, Single Phase, 50/60 Hz			
I/O Power Supply†	Voltage	12 to 24 VDC ± 10%			
	Current	500 mA			
Loop Update Time	Position Loop	0.26 ms			
	Velocity Loop	0.26 ms			
	Current Loop	0.0868 ms			
Command Input Filter Time Constant	Pulse Command	1 μs			
	Velocity Command	50 μs			
	Torque Command	50 μs			
Weight	lb. [kg]	8.58 [3.9]	9.46 [4.3]	21.8 [9.9]	21.8 [9.9]
External Regenerative Resistor Specifications	Turn On Voltage	380 VDC			
	Peak Power @ Min. Resistance	16,000 W			
	Min. Resistance	10 Ω			
	Maximum Current (A_{0-p})	40 A			

* Single-phase operation of 230 VAC models rated 200 W and larger require derating of the motor torque by 2.5% per °C above 40°C up to 50°C maximum.

† The SL Series amplifiers require a DC power supply for I/O power. One of the GE Fanuc 24 VDC power supplies, part numbers IC690PWR024 (5 Amp) or IC690PWR124 (10 Amp), is recommended. The same external DC power supply can be used to provide power to multiple amplifiers as long as the supply is rated for the total power drawn by all of the amplifiers.

V-Series Amplifier Environmental Specifications

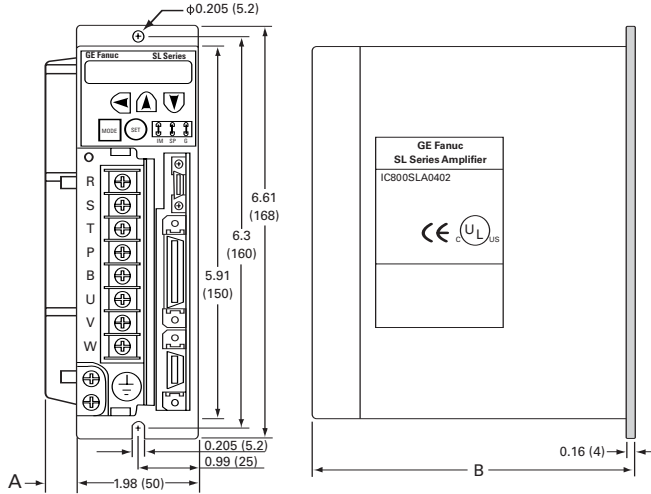
Relative Humidity	90% noncondensing
Altitude	3300 feet (1000 m)
Ambient Temperature	0 to 50°C operating
Storage Temperature	-20 to 80°C
Shock	15 G non-operating
Vibration	15 G @ 10-150 Hz

Servo Amplifiers

SL Series Servo Amplifiers

SL Amplifier Dimensions—Z-Series

in (mm)



Z-Series Amplifier Dimensions

120 V Models

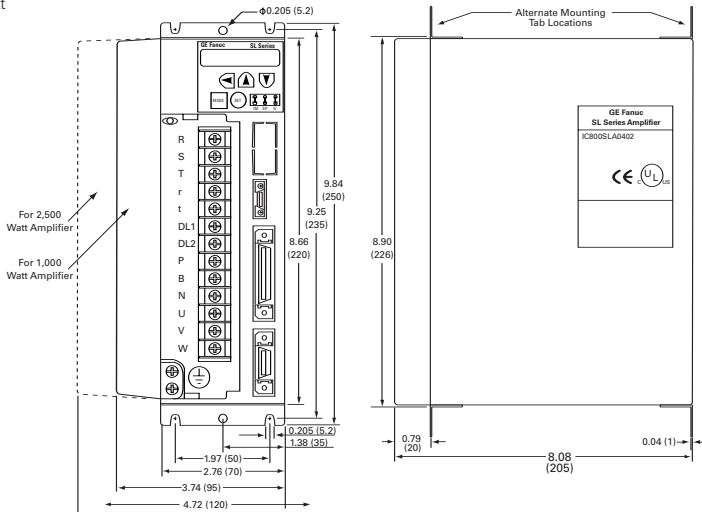
Model	A in (mm)	B in (mm)
30-100 W	0	5.12 (130)
200 W	0.59 (15)	5.12 (130)
400 W	0.59 (15)	6.69 (170)
750 W	n/a	n/a

230 V Models

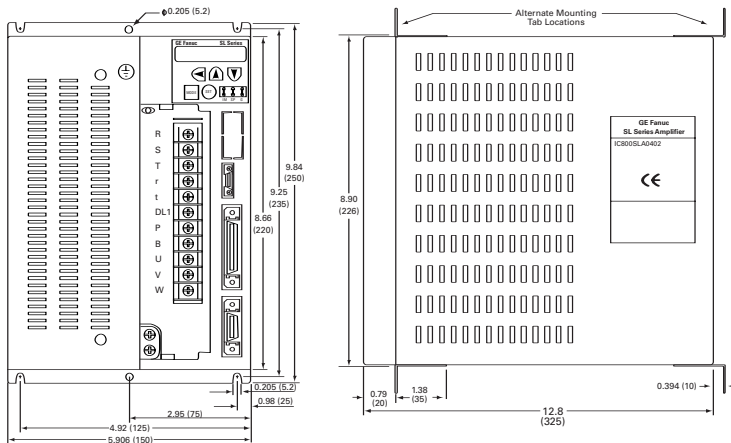
Model	A in (mm)	B in (mm)
30-100 W	0	5.12 (130)
200 W	0	5.12 (130)
400 W	0.59 (15)	5.12 (130)
750 W	0.59 (15)	6.69 (170)

SL Amplifier Dimensions—V-Series

1,000 and 2,500 Watt



3,500 and 5,000 Watt



Servo Amplifiers

SL Series Servo Amplifier

Ordering Information

To place an order for a complete servo system, select the S-Series Servo Motor that meets your application requirements, then select the amplifier, cables and accessories. Detailed information on S-Series motors is available in the servo motor section of this catalog. The SDM and SGM model motors cannot be used with the SL-Series amplifiers.

Amplifiers and Motors Ordering Information

115 VAC Models	Part Numbers				
	30 Watt	50 Watt	100 Watt	200 Watt	400 Watt
Motor	IC800SLM003N3NE25	IC800SLM005N3NE25	IC800SLM010N1NE25	IC800SLM020N1KE25	IC800SLM040N1KE25
Motor/Brake	IC800SLM003N3BE25	IC800SLM005N3BE25	IC800SLM010N1BE25	IC800SLM020N1XE25	IC800SLM040N1XE25
Amplifier	IC800SLA0031	IC800SLA0051	IC800SLA0101	IC800SLA0201	IC800SLA0401

230 VAC Models	Part Numbers				
	30 Watt	50 Watt	100 Watt	200 Watt	400 Watt
Motor	IC800SLM003N3NE25	IC800SLM005N3NE25	IC800SLM010N2NE25	IC800SLM020N2KE25	IC800SLM040N2KE25
Motor/Brake	IC800SLM003N3BE25	IC800SLM005N3BE25	IC800SLM010N2BE25	IC800SLM020N2XE25	IC800SLM040N2XE25
Amplifier	IC800SLA0032	IC800SLA0052	IC800SLA0102	IC800SLA0202	IC800SLA0402

	750 Watt	1000 Watt	2500 Watt	3500 Watt	5000 Watt
	Motor	IC800SLM075N2KE25	IC800SLM100N2KE25	IC800SLM250M2KE25	IC800SLM350M2KE25
Motor/Brake	IC800SLM075N2XE25	IC800SLM100N2XE25	IC800SLM250M2XE25	IC800SLM350M2XE25	IC800SLM500M2XE25
Amplifier	IC800SLA0752	IC800SLA1002	IC800SLA2502	IC800SLA3502	IC800SLA5002

Cable and Accessories Ordering Information

GE Fanuc does not ship mating power or feedback connectors for S-Series motors with the motor. See the appropriate motor section of this catalog for motor connector information.

Item	Description	Part Number	Description	Part Number
Motor Encoder Cable	5 m for 30-750 W models	IC800SLCEZ050	10 m for 30-750 W models	IC800SLCEZ100
	5 m for 1-5 kW models	IC800SLCEV050	10 m for 1-5 kW models	IC800SLCEV100
Motor Power Cable	5 m for 30-750 W models	IC800SLCPZ050	10 m for 30-750 W models	IC800SLCPZ100
	5 m for 1-2.5 kW models	IC800SLCPV050	10 m for 1-2.5 kW models	IC800SLCPV100
	5 m for 1-2.5 kW models with brake	IC800SLCBV050	10 m for 1-2.5 kW models with brake	IC800SLCBV100
	5 m for 3.5 & 5 kW models	IC800SLCPVL050	10 m for 3.5-5 kW models	IC800SLCPVL100
	5 m for 3.5 & 5 kW models with brake	IC800SLCBVL050	10 m for 3.5-5 kW models with brake	IC800SLCBVL100
Motor Brake Cable*	5 m for 30-750 W models with brake	IC800SLCBZ050	10 m for 30-750 W models with brake	IC800SLCBZ100
Interface Cable	1 m for 30-750 W models to IC800SLT001	IC800SLCIZ010	3 m for 30-750 W models to IC800SLT001	IC800SLCIZ030
	1 m for 1-5 kW models to IC800SLT001	IC800SLCIV010	3 m for 1-5 kW models to IC800SLT001	IC800SLCIV030
	1 m for 30-750 W models with flying leads	IC800SLCFLYZ010	3 m for 30-750 W models with flying leads	IC800SLCFLYZ030
	1 m for 1-5 kW models with flying leads	IC800SLCFLYV010	3 m for 1-5 kW models with flying leads	IC800SLCFLYV030
Control Cable†	1 m for DSM300 interface to IC800SLT001	IC693CBL324	3 m for DSM300 interface to IC800SLT001	IC693CBL325
Serial Cable‡	2 m for PC interface	IC800SLCS020		
Terminal Blocks	DSM Interface Block	IC800SLT001	Breakout Terminal Block (54 screw terminals)	IC800SLT004
External Regeneration	50 Ω, 100 W Resistor Kit	IC800SLR001	20 Ω, 300 W Resistor Kit	IC800SLR003
Resistor Kits	100 Ω, 225 W Resistor Kit	IC800SLR002	15 Ω, 1000 W Resistor Kit	IC800SLR004
SLconfig S/W§	SL Configuration software	IC641SWP800		

* 30-750 W models only - Brake cable for 1-5 kW model S-Series motors are integral to the power/brake cable when required.

† This cable connects the GE Fanuc DSM302/314 motion controller to the SL Series terminal block assembly IC800SLT001.

‡ Connects amplifier to PC when using SLconfig software.

§ This software is recommended for all new customers. Only one copy per customer is required for amplifier configuration using a PC.

Servo Amplifiers

α and β Series Servo Amplifiers

All Digital Servo Systems Offer High Performance and Reliability.

GE Fanuc α and β Series Servo Drives, based on over four million axes installed world-wide, offer superior reliability and performance for unprecedented mean time between failure. The α and β Series Servos are available in a wide range of ratings for use with GE Fanuc DSM300 Series motion controllers.

High-Performance Serial Encoders

Standard serial encoders built into the motors provide exceptional feedback resolution of 32K, 64K or 128K counts per revolution. Serial encoders support higher resolutions at high motor velocities than standard quadrature encoders and are more immune to noise. An optional battery connection provides absolute position feedback, eliminating the need to home the system after a power shutdown.

Reduced Tuning and Setup

There is no need for potentiometer tuning or personality modules; little tuning is required for properly sized drives. All drive parameters are stored in the controller in a standard motor database. Configuration settings are not stored in the drive, making it possible to replace drives with little set-up time. Stored drive and machine parameters are quickly transferred to repeat production machines.

All-Digital System

All control loops—current, velocity, and position—are closed in the GE Fanuc DSM Series motion controller. High-speed microprocessors and/or digital signal processors (DSPs) in the controller provide loop update times of 250 μ s. The high response servo system can compensate for machine design limitations, yielding faster acceleration/deceleration rates and better responses to load changes.

All-Digital Servo Command Signals

The DSM324*i* and Beta *i* Series amplifiers use a high speed fiber optic command interface. The DSM302 and DSM314 use a PWM command interface between the controller and amplifier which improves efficiency by varying the on-time of the transistor switches that control motor voltage and current. With its superior noise immunity, both of these GE Fanuc digital command interfaces allows for an increased signal to noise ratio for improved accuracy and performance.



α Series Servo Features

- World leading reliability
- Low maintenance, no component “drift”, no commutator brushes
- Digitally set parameters, no tuning required when replacing an amplifier module
- Exceptional smoothness, stiffness, and precision for the most demanding applications
- Torque ratings of 53 to 495 in-lb (6 to 56 Nm)
- Optional 90 VDC holding brake
- IP67 environmental rating on most motors
- Standard 64K serial encoder with optional battery backup to maintain absolute position when power is removed

Agency Approvals

UL, IEC rating and CE mark compliant

β Series Servo Features

- Very economical, high-performance servo system for a broad range of applications
- Torque ratings:
 - Beta Series: 5.3 to 105 in-lb (0.6 to 12 Nm)
 - Beta *i* Series: 3.5 to 177 in-lb (0.4 to 20 Nm)
- Feedback (serial encoder with optional battery backup):
 - Beta Series: 32 K
 - Beta *i* Series:* 64 K (B0.4 to B1) 128 K (B2 to B22)
- Smaller rotor for better acceleration and higher machine cycle rates contributes to motor designs 15% shorter and lighter than comparable servos with no sacrifice to environmental protection
- Low maintenance, no component “drift”, no commutator or brushes to wear out
- All parameters digitally set in motion controller. No tuning required when replacing an amplifier module.
- IP65 Protection Rating

*Super cap holds position data for approximately 10 minutes without battery option.

INFO

For application, installation, and tuning information, consult the Services website at www.gefanuc.com.

Servo Amplifiers

α and β Series Servo

System Power Requirements

AC Power Specification	Description
Voltage: 3-phase 1-phase (see below)	200-240VAC 220-240VAC
Frequency	50Hz, 60Hz
Allowable frequency fluctuation	± 2 Hz
Voltage fluctuation during acceleration/deceleration	7% or less

The β Series Servo amplifiers can be run on single phase power; however, the life-time of the amplifier is reduced because of higher input and ripple current. For operation of $\beta 6/2000$ or $\alpha C12/2000$ motors at acceleration/ deceleration duty cycles greater than 1 cycle/20 seconds, 3-phase input is required. An AC line filter is strongly recommended to suppress the

influences of high-frequency input line noise on the drive power supply. If a power source within the specified voltage range is not available, a transformer is required. The kVA rating of the transformer should be equal to or greater than the sum of all motor kW ratings. If an isolation-type power transformer is used, an AC line filter is not required.

GE Fanuc offers the following line filters; transformers must be supplied by the user as required.

Part Number	Description
A81L-0001-0083#3C	5.4 kW, 3-phase AC line filter
A81L-0001-0101#C	10.5 kW, 3-phase AC line filter

DC Power Specification

The β Series and Beta *i* Series amplifiers require a 24VDC power supply for amplifier control power. This DC power supply must be supplied by the user. We recommend the GE Fanuc 24VDC power supply, part

number IC690PWR024. The same external DC power supply can be used to provide power to multiple amplifiers as long as the supply is rated for the total current requirements of all of the amplifiers.



Motor Model	Max. kW Rating
$\beta 0.4/5000$ <i>is</i>	0.13
$\beta 0.5/5000$ <i>is</i>	0.2
$\beta 1/5000$ <i>is</i>	0.4
$\beta 2/4000$ <i>is</i>	0.5
$\beta 4/4000$ <i>is</i>	0.75
$\beta 8/3000$ <i>is</i>	1.2
$\beta 12/3000$ <i>is</i>	1.8
$\beta 22/2000$ <i>is</i>	2.5
$\beta M0.5/4000$	0.2
$\beta M1/4000$	0.4
$\beta 0.5/3000$	0.2
$\beta 2/3000$	0.5
$\beta 3/3000$	0.5
$\beta 6/2000$	0.9
$\alpha 1/3000$	0.3
$\alpha 6/3000$	1.4
$\alpha C12/2000$	1.0
$\alpha 12/3000$	2.8
$\alpha 22/2000$	3.7
$\alpha 30/3000$	5.2
$\alpha 40/2000$	7.2

Incoming DC Power for β Series Description

Input Voltage	24VDC ($\pm 10\%$)
Current Requirement (per amplifier):	
Beta Series	0.4 amps
Beta <i>i</i> Series	0.9 amps

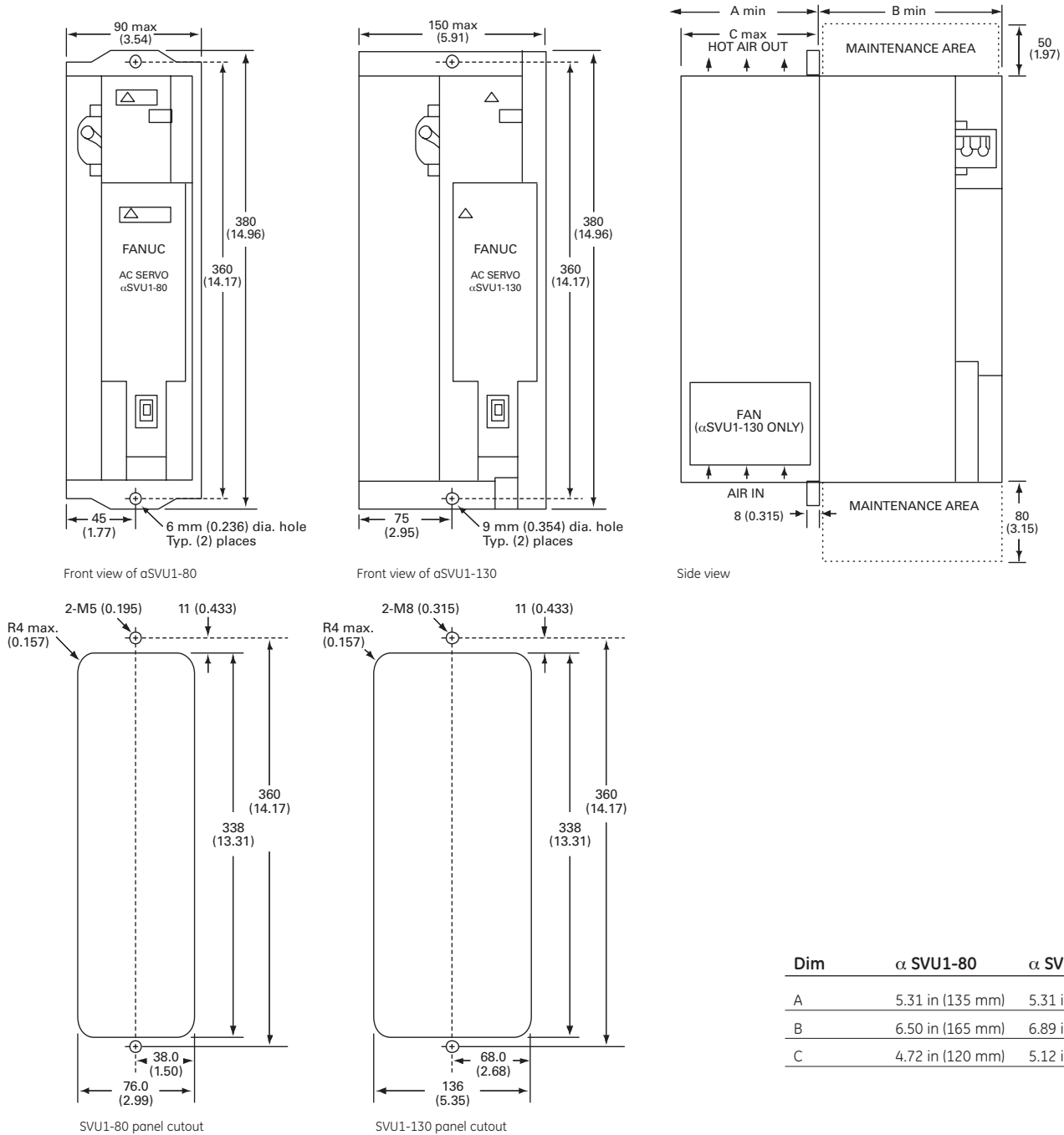
Servo Amplifiers

α Series Servo Amplifier

Dimensions

The α SVU Series amplifiers are designed with a rear-mounted heat sink that extends through a hole in the mounting plate. This design eliminates most of the heat dissipation inside the control cabinet, reducing the temperature rise in the cabinet and the load on cabinet cooling equipment.

α SVU1-80 and α SVU1-130 Dimension Drawings



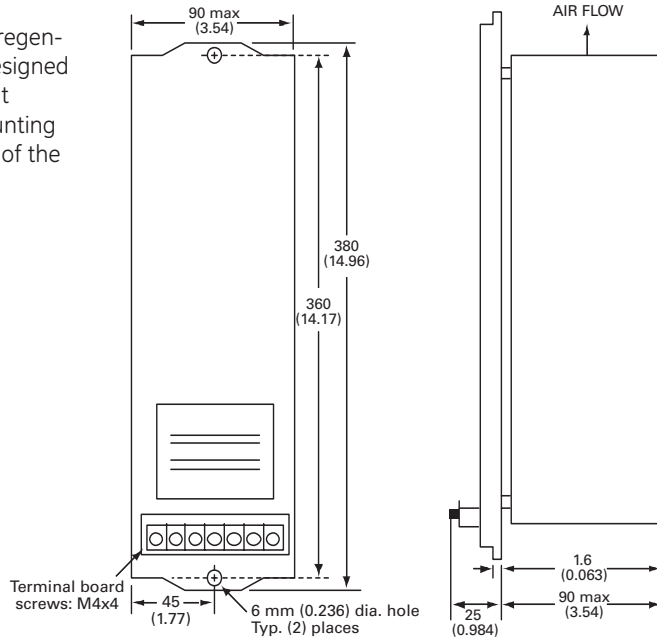
Dim	α SVU1-80	α SVU1-130
A	5.31 in (135 mm)	5.31 in (135 mm)
B	6.50 in (165 mm)	6.89 in (175 mm)
C	4.72 in (120 mm)	5.12 in (130 mm)

α Series Servo Amplifier

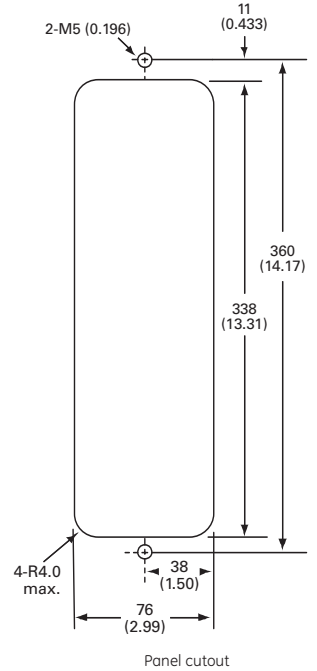
α Series Regenerative Discharge Unit Dimensions

The α Series Servos use separate regenerative discharge units that are designed with a rear-mounted heat sink that extends through a hole in the mounting plate. This design eliminates most of the heat inside the control cabinet.

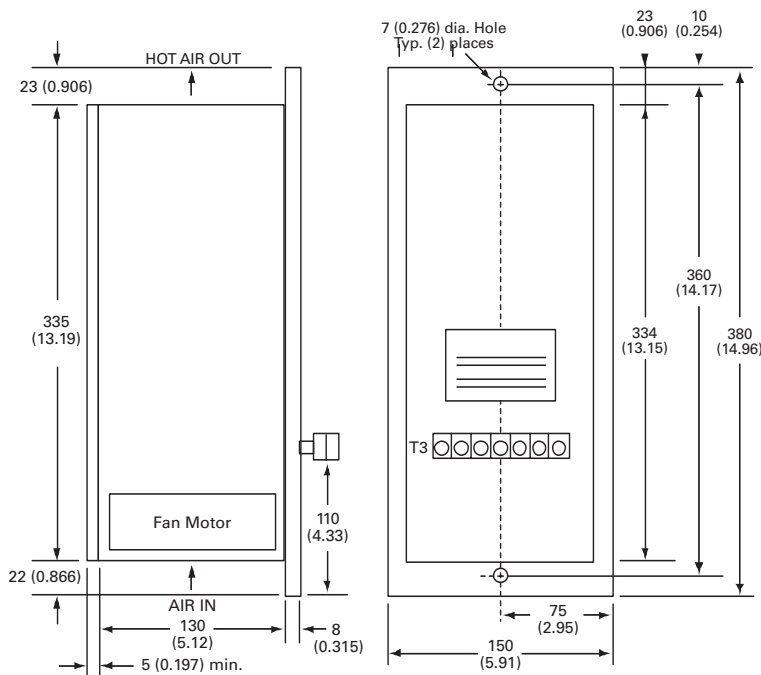
A06B-6089-H500 (200W) for the α SVU1-80



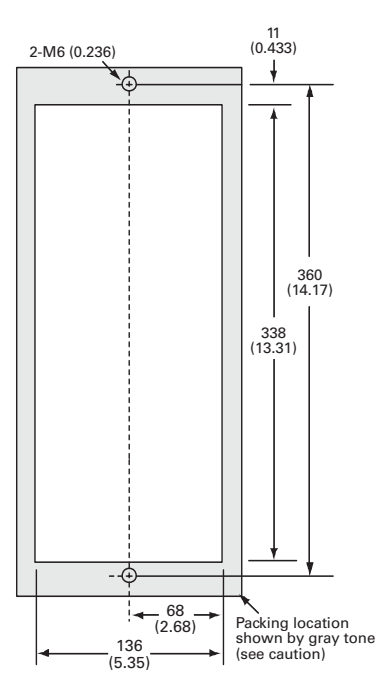
A06B-6089-H500 (200 W) for the α SVU1-80



**A06B-6089-H711 (800 W) for the a SVU1-130
A06B-6089-H713 (800 W) for the a SVU1-80**



**A06B-6089-H711 (800 W) for the a SVU1-130
A06B-6089-H713 (800 W) for the a SVU1-80**



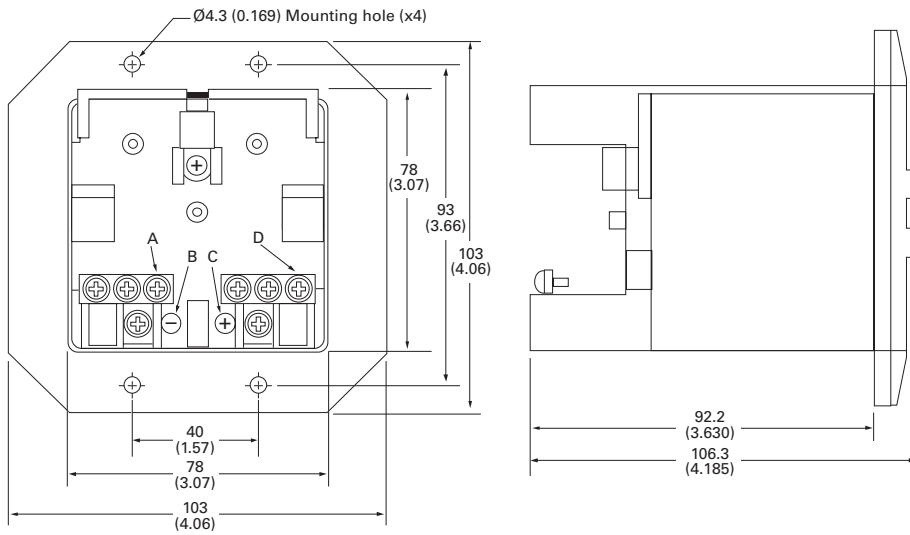
CAUTION: Attach packing (acrylonitrile-butadiene rubber or soft NBR) around the cutout to keep out oil and dust.

Panel cutout

Servo Amplifiers

α Series Servo Amplifiers

Encoder Battery Kit Dimensions



Absolute encoder battery pack

Key:

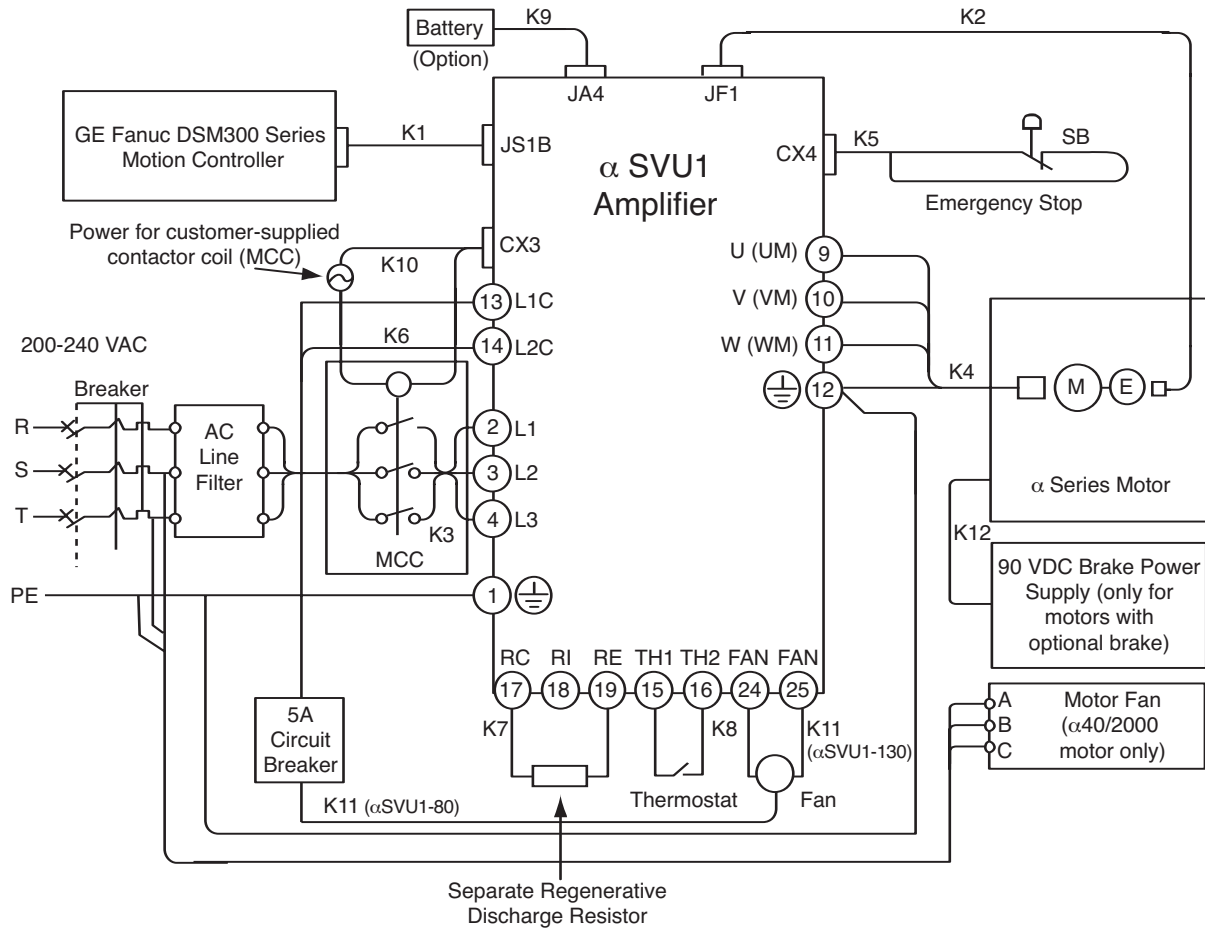
- A 3-M3 negative terminals
- B Negative terminal indication
- C Positive terminal indication
- D 3-M3 positive terminals
- E 4-Ø4.3 (0.169) mounting holes

α Series Servo Amplifiers Electrical Specifications

Amp Model Number	αSVU1-80	αSVU1-130
AC Input Voltage - VAC	200-240	200-240
Cont. AC Power requirements	2.2kVA	8.2kVA
Rated current output $A_{(rms)}$	18.7	52.2
Peak output (for 3 sec) A	80	130
Amp Heat Loss (max)	26.1	59.3
Input Current 3 f $A_{(rms)}$	4.5	24.7
Input Current 1f $A_{(rms)}$	n/a	n/a
Regen Capacity	100 W Internal	400 W Internal
Control Power Requirements	230VAC, 130mA	230VAC, 260mA

α Series Servo Amplifiers

Connection Diagram



Notes:

- An AC line filter is recommended (unless an isolation transformer is provided) to reduce the effect of harmonic noises to the power supply. Two or more αSVU amplifiers can be connected to one AC line filter if its power capacity is not exceeded.
- RC and RI are connected to each other through a jumper bar at the factory. If a separate regenerative discharge unit will be used, the jumper bar must be removed.
- TH1 and TH2 are connected to each other through a jumper bar at the factory. Remove the jumper bar and connect these terminals to the separate regenerative discharge unit resistor thermal switch.
- Only the αSVU1-130 (A06B-6089-H106) has FAN1 and FAN2 terminals. Connect these terminals to the fan motor (K11 cable) of the separate regenerative discharge unit if required. If a fan is to be used with the αSVU1-80, the fan power should be connected to L1C and L2C through a 5-amp circuit breaker as shown.
- For CE Mark applications, an MCC that complies with European standards should be selected. The user should determine details of the use of the MCC.

Servo Amplifiers

α Series Servo Amplifiers

Ordering Information

The α Series amplifiers can be ordered as individual components or as a kit which includes connectors and spare fuses. The kit is recommended for new installations. For spare parts or replacement units the individual amplifier may be ordered.

To place an order for a complete servo system, select the Servo Motor that meets your application requirements, then select the amplifier package and cables or connectors (customer built cables). The amplifier package includes amplifier mating connectors, regen resistor and spare DC supply fuse.

α Series Servo Amplifier Kits*

Part Number	Description	Kit Contents
IC800APK080	80 Amp α Series Amplifier Package	SVU1-80 Amp (A06B-6089-H105) Fuse (qty 1) (A06B-6089-K250) External MCC Connector (A06B-6089-K201) E-Stop Connector (A02B-0120-K321)
IC800APK130	130 Amp α Series Amplifier Package	SVU1-130 Amp (A06B-6089-H106) Fuse (qty 2) (A06B-6089-K250) External MCC Connector (A06B-6089-K201) E-Stop Connector (A02B-0120-K321)

*Amplifier kits provide all of the required components for complete installation; we strongly encourage kits be ordered for new systems. Separate amplifiers are available for spare or replacement units.

Amplifier and Motor Ordering Information

Motor Model	α6/3000	α12/3000	α22/2000	α30/3000	α40/2000
Amplifier Package	IC800APK080	IC800APK080	IC800APK080	IC800APK130	IC800APK130
Amplifier (replacement only)	A06B-6089-H105	A06B-6089-H105	A06B-6089-H105	A06B-6089-H106	A06B-6089-H106
Motor Encoder Feedback Cable (14 meters)	CF3A-2MPB-0140-AZ	CF3A-2MPB-0140-AZ	CF3A-2MPB-0140-AZ	CF3A-2MPB-0140-AZ	CF3A-2MPB-0140-AZ
Motor Power Cable (14 meters)	IC800CBL061	IC800CBL062	IC800CBL062	IC800CBL063	IC800CBL063
Motor Encoder Connector**	A06B-6050-K115	44A730464-G38	44A730464-G38	44A730464-G38	44A730464-G38
Motor Power Connector**	44A730464-G18	44A730464-G20	44A730464-G20	44A730464-G21	44A730464-G21
Command Signal Cable	For use with DSM302 and DSM314: IC800CBL001 (1m) or IC800CBL002 (3m)				
Motor Part Number	A06B-0128-B575#7008	A06B-0143-B075#7008	A06B-0147-B075#7008	A06B-0153-B075#7008	A06B-0158-B075#7008
Servo Motor with Holding Brake	A06B-0128-B675#7008	A06B-0143-B175#7008	A06B-0147-B175#7008	A06B-0153-B175#7008	A06B-0158-B175#7008
Servo Motor with IP67 Sealing	A06B-0128-B575#7076	A06B-0143-B075#7076	A06B-0147-B075#7076	A06B-0153-B075#7076	Not Available
Servo Motor with IP67 Sealing and Holding Brake	A06B-0128-B675#7076	A06B-0143-B175#7076	A06B-0147-B175#7076	A06B-0153-B175#7076	Not Available
Encoder Battery Kit	Same Kit for all α Series servo systems: IC800ABK001 Kit includes battery holder and four D-cell alkaline batteries In addition, one connection cable 44C741863-001 is required per amplifier				
Motor Brake Cable/Connector	44C742238-004 (14 meter cable)/44A730464-G26 (connector) for use with all α series motors.				

** Motor connectors are not required if encoder and power cables are purchased from GE Fanuc.

α Series Servo Regenerative Discharge Units

Part Number	Description
A06B-6089-H500	Regenerative Resistor: 16 Ohm, 200 Watt for α80 Amplifier
A06B-6089-H711	Regenerative Resistor: 16 Ohm, 800 Watt with Fan for α130 Amplifier
A06B-6089-H713	Regenerative Resistor: 16 Ohm, 800 Watt with Fan for α80 Amplifier

α Series Accessories

Part Number	Description
A02B-0120-K321	E-Stop Connector (one per amplifier; included in amplifier kit)
44A730464-G26	α40/2000 motor fan power connector
A06B-6089-K201	External MCC Connector (CX3) for α Series amplifiers (one per amplifier when using external MCC; included in amplifier kit)
44B295864-001	Grounding Bar for up to 10 cables (A99L-0035-0001 Grounding Clamps Required)
A99L-0035-0001	Cable Shield Grounding Clamps for 44B295864-001 Grounding Bar
A06B-6089-K250	Spare Control Power Input Fuse
A06B-6073-K214	Amplifier encoder feedback connector (JF1)

Regenerative Resistor

For applications where the built-in Regenerative capacity is insufficient, a separate (external) regenerative resistor is recommended. Contact GE Fanuc for assistance in selecting a regenerative resistor.

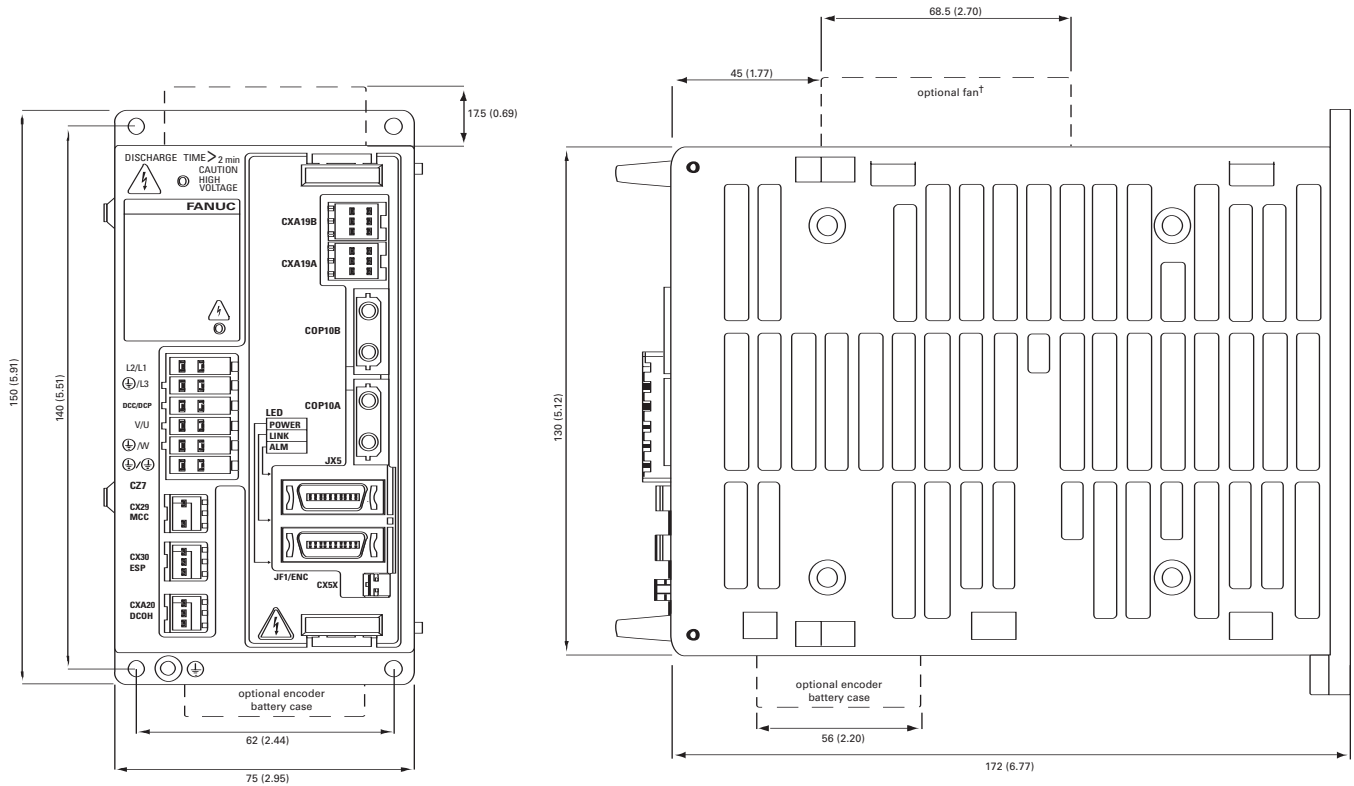
Servo Amplifiers

βi Series Servo Amplifiers

Dimensions

The βi Series amplifiers are panel mounted devices with dimensions as shown. When installing the amplifiers make sure to maintain the specified clearances above, below and between adjacent amplifiers to allow for proper convection cooling.

βi Series Servo Amplifier Unit $\beta SVM1-20i$



Dimensions shown in mm (in).

βi Series Servo Amplifiers Electrical Specifications

Model	$\beta SVM1-20i$
Rated output current (rms amps)	5.9
Current limit (Peak amps)	20
AC Power	200-240 VAC (3-phase), 220-240 VAC (1-phase) 50/60 Hz \pm 2 Hz
DC Power	24 VDC \pm 10% @ 0.9 Amp per amplifier
Heat loss (watts)	66
Regenerative discharge	16J
Maintenance Clearances:	
Above and below amplifier	40 (1.57)
Beside and between amplifiers	10 (0.39)

* These values are standard values at 20°C with a tolerance of \pm 10%. The speed-torque characteristics vary depending on the parameter setting and input voltage of the digital servo amplifiers. (The above figures show average values.) These values may be changed without prior notice.

† Separately installed cooling fan required for $\beta 4$ motor when a single phase AC power source is used and always with the $\beta 8$ motor.

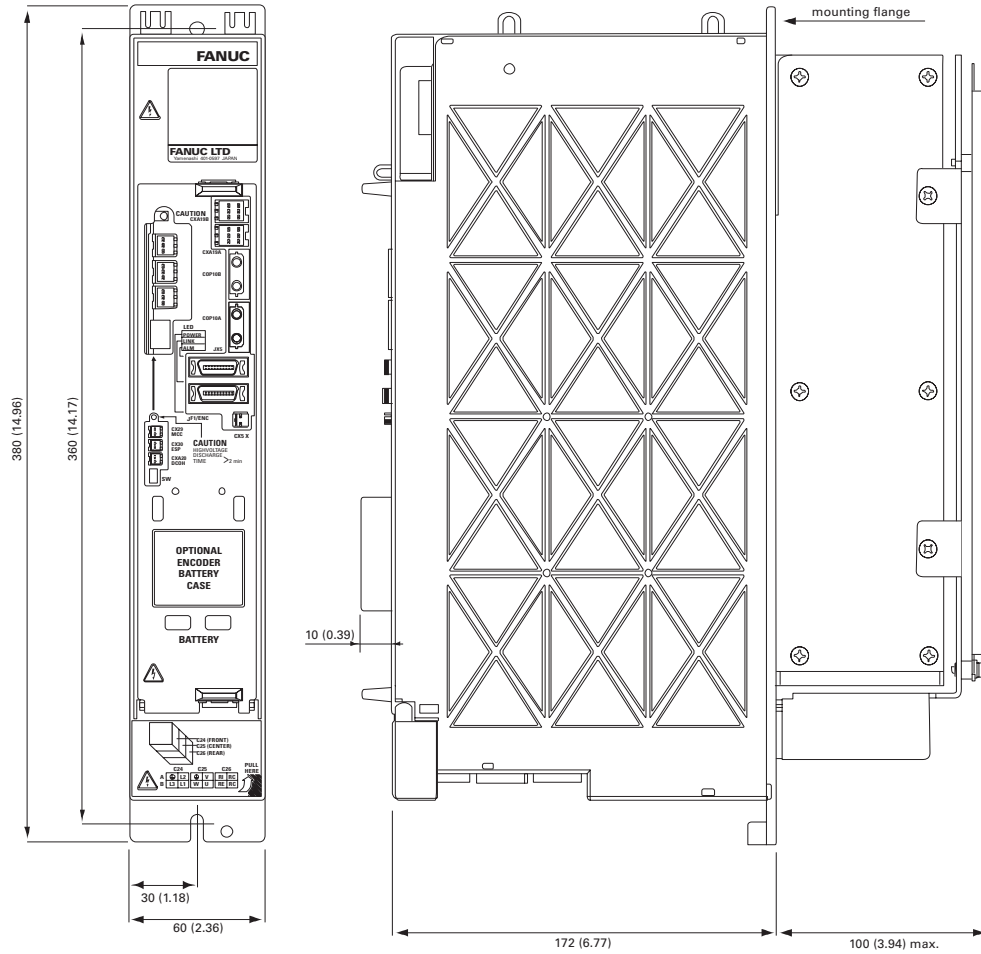
Servo Amplifiers

β i Series Servo Amplifiers

Dimensions

The β i Series amplifiers are panel mounted devices with dimensions as shown. When installing the amplifiers make sure to maintain the specified clearances above, below and between adjacent amplifiers to allow for proper convection cooling.

β i Series Servo Amplifier Unit β SVM1-40i



Dimensions shown in mm (in).

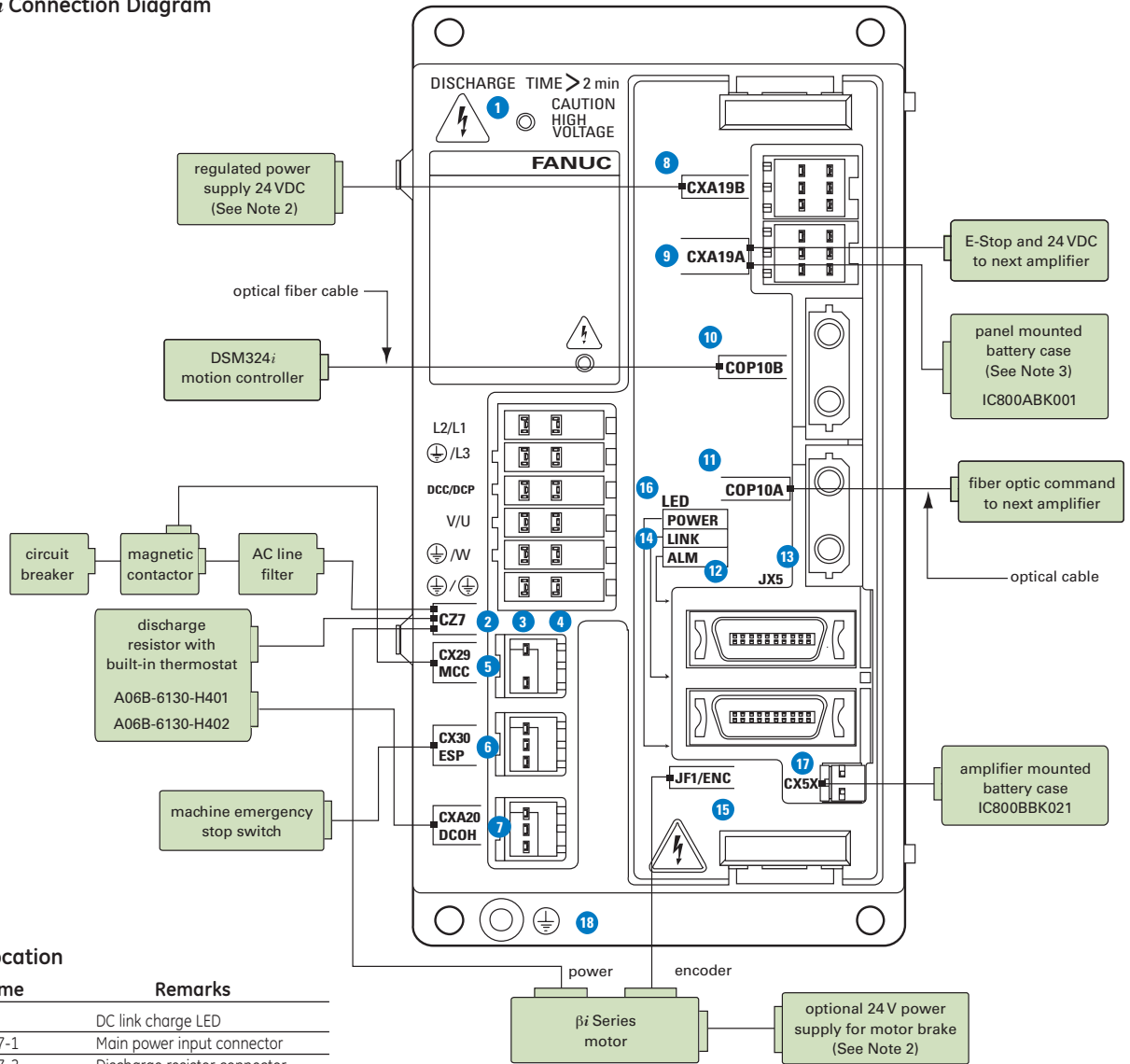
β i Series Servo Amplifiers Electrical Specifications

Model	β SVM1-40i
Rated output current (rms amps)	12
Current limit (Peak amps)	40
AC Power	200-240 VAC (3-phase), 220-240 VAC (1-phase) 50/60 Hz \pm 2 Hz
DC Power	24 VDC \pm 10% @ 0.9 Amp per amplifier
Heat loss (watts)	100
Regenerative discharge	50W
Maintenance Clearances:	
Above and below amplifier	50 (1.97)
Beside and between amplifiers	n/a

* These values are standard values at 20°C with a tolerance of \pm 10%. The speed-torque characteristics vary depending on the parameter setting and input voltage of the digital servo amplifiers. (The above figures show average values.) These values may be changed without prior notice.

β i Series Servo Amplifiers

β SVM1-20i Connection Diagram



Connector Location

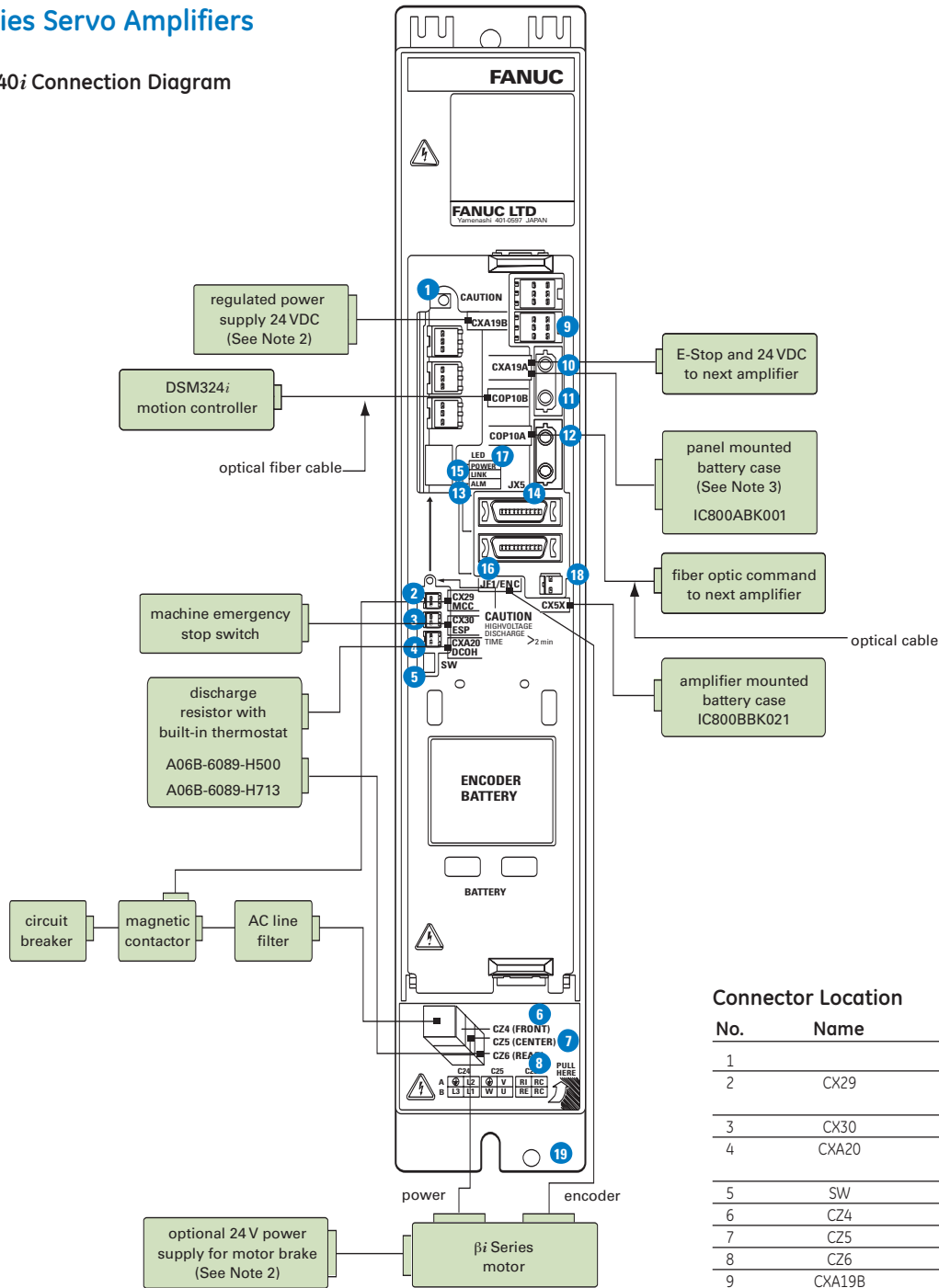
No.	Name	Remarks
1		DC link charge LED
2	CZ7-1	Main power input connector
3	CZ7-2	Discharge resistor connector
4	CZ7-3	Motor power connector
5	CX29	Connector for main power MCC control signal
6	CX30	E-Stop signal connector
7	CXA20	Regenerative resistor overtemperature switch connector
8	CXA19B	24 VDC power input
9	CXA19A	24 VDC power input
10	COP10B	Fiber optic servo command
11	COP10A	Fiber optic servo command
12	ALM	Servo alarm status LED
13	JX5	Reserved
14	LINK	Fiber optic link status LED
15	JF1	Serial Encoder Feedback
16	POWER	Control power status display LED
17	CX5X	Absolute encoder battery
18		Tapped hole for grounding the amplifier

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800BBK021 1-axis lithium battery can be snapped onto each amplifier.

βi Series Servo Amplifiers

βSVM1-40i Connection Diagram



Connector Location

No.	Name	Remarks
1		DC link charge LED
2	CX29	Connector for main power MCC control signal
3	CX30	E-Stop signal connector
4	CXA20	Regenerative resistor overtemperature switch connector
5	SW	Setting switch (DC alarm level)
6	C24	Main power input connector
7	C25	Motor power connector
8	C26	Discharge resistor connector
9	CXA19B	24 VDC power input
10	CXA19A	24 VDC power input
11	COP10B	Fiber optic servo command
12	COP10A	Fiber optic servo command
13	ALM	Servo alarm status LED
14	JX5	Reserved
15	LINK	Fiberoptic link status LED
16	JF1	Serial Encoder Feedback
17	POWER	Control power status display LED
18	CX5X	Absolute encoder battery
19		Tapped hole for grounding the amplifier

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800BBK021 1-axis lithium battery can be snapped onto each amplifier.

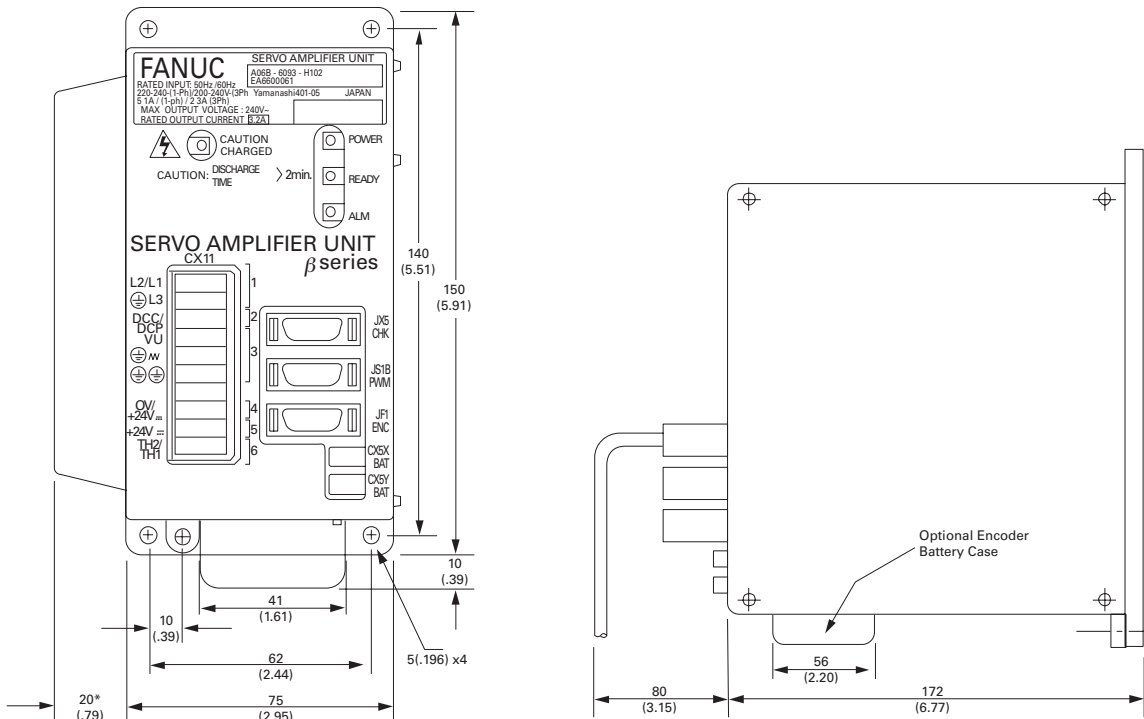
Servo Amplifiers

β Series Servo Amplifiers

Dimensions

The β Series amplifiers are panel mounted devices with dimensions as shown. When installing the amplifiers make sure to maintain clearances of 1.57 inches (40 mm) above and below the amplifier and 0.39 inches (10 mm) between adjacent amplifiers to allow for proper convection cooling.

β Series Servo Amplifier Unit



*Measurement applies to the β20 amplifier only. The β12 amplifier does not include the heat sink extension. Dimensions shown in mm (in).

β Series Servo Amplifiers Electrical Specifications

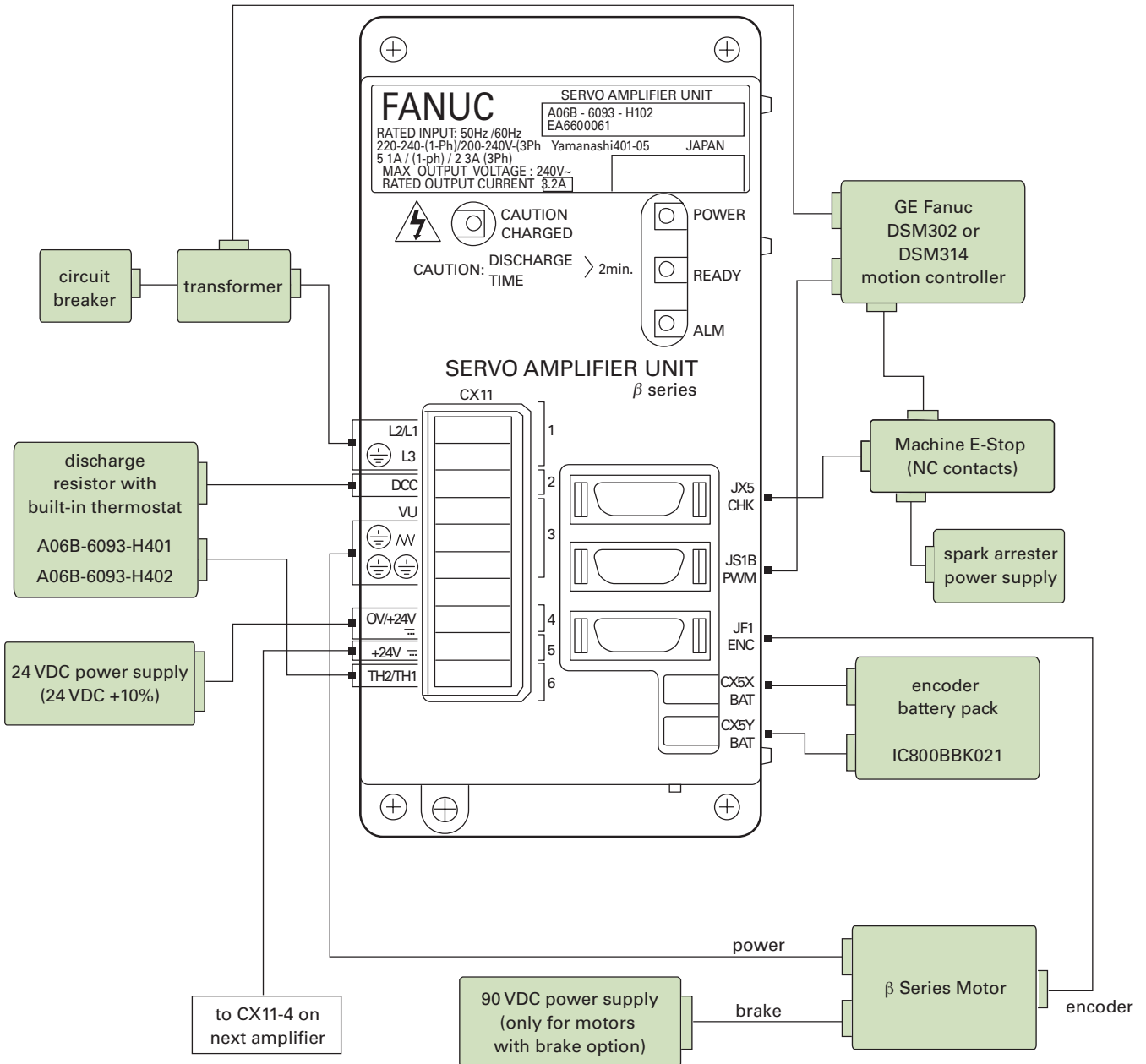
Model	βSVU1-12	βSVU1-20
Rated output current (rms amps)	3.2	5.9
Current limit (Peak amps)	12	20
AC Power	200-240 VAC (3-phase), 220-240 VAC (1-phase) 50/60 Hz ± 2 Hz	
DC Power	24 VDC ± 10% @ 0.4 Amp per amplifier	
Heat loss (watts)	17.5	33.3

* These values are standard values at 20°C with a tolerance of ±10%. The speed-torque characteristics vary depending on the parameter setting and input voltage of the digital servo amplifiers. (The above figures show average values.) These values may be changed without prior notice.

Servo Amplifiers

β Series Servo Amplifiers

Connection Diagram



- 1 Line filter and lightning surge absorber can be used in place of a transformer when 200-240 VAC is available to the cabinet.
- 2 A full wave rectified 115 VAC may be used as the power supply.
- 3 For single-phase operation, AC line phase T is not connected. Single phase operation requires the output current to be derated (consult GE Fanuc).

Servo Amplifiers

βi Series Servo Amplifiers

Ordering Information

The βi series amplifiers can be ordered as individual components or as kits that include connectors, regenerative discharge resistor and spare fuses. The kit is recommended for new installation while spare parts, or replacement units, should use the amplifier only model number.

To place an order for a complete servo system, select the Servo Motor that meets your application requirements, then select the amplifier kit, cables or connectors (customer built cables) and accessories.

βi Series Servo Amplifier Kits*

Part Number	Kit Description	Kit Contents
IC800BIK020	20 Amp βi Series Amplifier Package	<ul style="list-style-type: none"> βSVM1-20<i>i</i> Amplifier (A06B-6130-H002) 20 W Regenerative Discharge Resistor (A06B-6130-H401) Spare 24 VDC Fuse (A06B-6073-K250) CZ7 Power Connector Kit (A06B-6130-K200) CXA19 24 VDC Connector Kit (A06B-6130-K201) CXA20 Regenerative Discharge Thermostat Connector Kit (A06B-6130-K202) CX29 MCC Connector Kit (A06B-6130-K203) CX30 E-Stop Connector Kit (A06B-6130-K204)
IC800BIK040	40 Amp βi Series Amplifier Package	<ul style="list-style-type: none"> βSVM1-40<i>i</i> Amplifier (A06B-6130-H003) Spare 24 VDC Fuse (A06B-6073-K250) CZ4 Power Connector Kit (A06B-6110-K200#XXS) CZ5 Motor Power Connector Kit (A06B-6110-K202#YYS) CZ6 Regenerative Discharge Resistor Connector Kit (A06B-6110-K201#XYM) CXA19 24 VDC Connector Kit (A06B-6130-K201) CXA20 Regenerative Resistor Thermostat Connector Kit (A06B-6130-K202) CX29 MCC Connector Kit (A06B-6130-K203)

*Amplifier kits provide all of the required amplifier components for complete installation; we strongly encourage kits be ordered for new systems. Separate amplifiers are available for spare or replacement units.

Holding Brake: For system designs which include a vertical axis that must hold its position when power is removed, a motor holding brake option is available. User supplied 24VDC power is required. To connect to the power, a separate brake cable is required on all motors except $\beta 2$ and $\beta 4$ models.

Encoder Battery Kit: All βi s Series Servo motors feature a built-in serial encoder that can be used in either incremental or absolute mode. In order to utilize the absolute capability, an optional encoder battery pack must be installed. This pack allows the encoder's position information to be retained so that the machine does not need to be referenced to a home

position every time power is restored to the system.

The 1-axis battery pack includes a small lithium battery and case which snaps on the amplifier unit. The 4-axis battery pack is panel mounted and uses standard D-cell batteries.

Servo Amplifiers

β i Series Servo Amplifier and Motor Ordering Information

Model Number	β 0.4/5000is	β 0.5/5000is	β 1/5000is
Servo Motor	A06B-0114-B203	A06B-0115-B203	A06B-0116-B203
Servo Motor w/ Holding Brake	A06B-0114-B503	A06B-0115-B503	A06B-0116-B503
Amplifier Kit	IC800BIK020	IC800BIK020	IC800BIK020
Amplifier Only	A06B-6130-H002	A06B-6130-H002	A06B-6130-H002
Amplifier Fan Kit (Note 1)	N/A	N/A	N/A

Cables and Accessories Ordering Information

Model Number		β 0.4/5000is	β 0.5/5000is	β 1/5000is
Power Cable	7 M	CP8B-1WPB-0070-AZ	CP8B-1WPB-0070-AZ	CP8B-1WPB-0070-AZ
	14 M	CP8B-1WPB-0140-AZ	CP8B-1WPB-0140-AZ	CP8B-1WPB-0140-AZ
Power Cable (Shielded)	7 M	CP8B-1WEB-0070-AZ	CP8B-1WEB-0070-AZ	CP8B-1WEB-0070-AZ
	14 M	CP8B-1WEB-0140-AZ	CP8B-1WEB-0140-AZ	CP8B-1WEB-0140-AZ
Feedback Cable (Right Angle)	7 M	CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ
	14 M	CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ
Feedback Cable (Straight)	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Holding Brake Power Cable	7 M	CB6N-5WPM-0070-AZ	CB6N-5WPM-0070-AZ	CB6N-5WPM-0070-AZ
	14 M	CB6N-5WPM-0140-AZ	CB6N-5WPM-0140-AZ	CB6N-5WPM-0140-AZ
External Regen Resistors	20 W	A06B-6130-H401	A06B-6130-H401	A06B-6130-H401
	100 W	A06B-6130-H402	A06B-6130-H402	A06B-6130-H402
	200 W	N/A	N/A	N/A
	800 W	N/A	N/A	N/A
CZ7 Power Connector Kit		A06B-6130-K200	A06B-6130-K200	A06B-6130-K200
CZ4 Power Connector Kit		N/A	N/A	N/A
CZ5 Motor Power Connector Kit		N/A	N/A	N/A
CZ6 Regen Resistor Thermostat Connector Kit		N/A	N/A	N/A
CXA19 24 VDC Connector Kit		A06B-6130-K201	A06B-6130-K201	A06B-6130-K201
CXA20 Regen Thermostat Connector Kit		A06B-6130-K202	A06B-6130-K202	A06B-6130-K202
CX29 MCC Connector Kit		A06B-6130-K203	A06B-6130-K203	A06B-6130-K203
CX30 E-Stop Input Connector Kit		A06B-6130-K204	A06B-6130-K204	A06B-6130-K204
Motor Feedback Connector Kit	90 Deg	A06B-6114-K204#E	A06B-6114-K204#E	A06B-6114-K204#E
	Straight	A06B-6114-K204#S	A06B-6114-K204#S	A06B-6114-K204#S
Motor Power/Brake Connector Kit	90 Deg	N/A	N/A	N/A
	Straight	N/A	N/A	N/A
Motor Power Connector Kit	90 Deg		A06B-6114-K230#E	
	Straight		A06B-6114-K230#S	
Motor Brake Power Connector Kit	90 Deg		A06B-6114-K232#E	
	Straight		A06B-6114-K232#S	
Spare Amplifier Control Power Fuse			A06B-6073-K250	
Encoder Battery	1 axis		IC800BBK021	
	4 axis		IC800ABK001 (Note 2)	
Fiberoptic Command Cable	15 CM		A66L-6001-0023#L150R0	
	1 M		A66L-6001-0023#L1R003	
	3 M		A66L-6001-0023#L3R003	
Fiberoptic Command Cable (sheathed)	1 M		A66L-6001-0026#L1R003	
	5 M		A66L-6001-0026#L5R003	
	10 M		A66L-6001-0026#L10R03	
	20 M		A66L-6001-0026#L20R03	
Amplifier Feedback Connector (JF1)			A06B-6073-K214	
AC Line Filter	5.4 kW		A81L-0001-0083#3C	
	10.5 kW		A81L-0001-0101#C	
Lithium Encoder Battery			A06B-6093-K001 (replacement battery for IC800BBK021 kit)	

1) Separate user installed cooling fan is only required for the β SVM1-20i amplifier and β 8/3000is motor or when single phase supply is used with the β 4/4000is motor

2) The IC800ABK001 panel mounted encoder battery pack requires CXA19 connector kit for user supplied cable. Uses 4 D-cell batteries.

Motion Solutions

Servo Amplifiers

$\beta 2/4000is$	$\beta 4/4000is$	$\beta 8/3000is$	$\beta 12/3000is$	$\beta 22/2000is$
A06B-0061-B203	A06B-0063-B203	A06B-0075-B203	A06B-0078-B203	A06B-0085-B203
A06B-0061-B503	A06B-0063-B503	A06B-0075-B503	A06B-0078-B503	A06B-0085-B503
IC800BIK020	IC800BIK020	IC800BIK020	IC800BIK040	IC800BIK040
A06B-6130-H002	A06B-6130-H002	A06B-6130-H002	A06B-6130-H003	A06B-6130-H003
N/A	A06B-6134-K003	A06B-6134-K003	N/A	N/A

$\beta 2/4000is$	$\beta 4/4000is$	$\beta 8/3000is$	$\beta 12/3000is$	$\beta 22/2000is$
CP9B-0WPB-0070-AZ	CP9B-0WPB-0070-AZ	CP3B-0WPB-0070-AZ	CP5B-0WPB-0070-AZ	CP6B-0WPB-0070-AZ
CP9B-0WPB-0140-AZ	CP9B-0WPB-0140-AZ	CP3B-0WPB-0140-AZ	CP5B-0WPB-0140-AZ	CP6B-0WPB-0140-AZ
CP9B-0WEB-0070-AZ	CP9B-0WEB-0070-AZ	CP3B-0WEB-0070-AZ	CP5B-0WEB-0070-AZ	CP6B-0WEB-0070-AZ
CP9B-0WEB-0140-AZ	CP9B-0WEB-0140-AZ	CP3B-0WEB-0140-AZ	CP5B-0WEB-0140-AZ	CP6B-0WEB-0140-AZ
CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ	CFDA-3WPB-0070-AZ
CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ	CFDA-3WPB-0140-AZ
CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Integrated with Power Cable	Integrated with Power Cable	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
Integrated with Power Cable	Integrated with Power Cable	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
A06B-6130-H401	A06B-6130-H401	A06B-6130-H401	N/A	N/A
A06B-6130-H402	A06B-6130-H402	A06B-6130-H402	N/A	N/A
N/A	N/A	N/A	A06B-6089-H500	A06B-6089-H500
N/A	N/A	N/A	A06B-6089-H713	A06B-6089-H713
A06B-6130-K200	A06B-6130-K200	A06B-6130-K200	N/A	N/A
N/A	N/A	N/A	A06B-6110-K200#XXS	A06B-6110-K200#XXS
N/A	N/A	N/A	A06B-6110-K202#YYS	A06B-6110-K202#YYS
N/A	N/A	N/A	A06B-6110-K201#XYM	A06B-6110-K201#XYM
A06B-6130-K201	A06B-6130-K201	A06B-6130-K201	A06B-6130-K201	A06B-6130-K201
A06B-6130-K202	A06B-6130-K202	A06B-6130-K202	A06B-6130-K202	A06B-6130-K202
A06B-6130-K203	A06B-6130-K203	A06B-6130-K203	A06B-6130-K203	A06B-6130-K203
A06B-6130-K204	A06B-6130-K204	A06B-6130-K204	A06B-6130-K204	A06B-6130-K204
A06B-6114-K204#E	A06B-6114-K204#E	A06B-6114-K204#E	A06B-6114-K204#E	A06B-6114-K204#E
A06B-6114-K204#S	A06B-6114-K204#S	A06B-6114-K204#S	A06B-6114-K204#S	A06B-6114-K204#S
A06B-6114-K220#E	A06B-6114-K220#E	N/A	N/A	N/A
A06B-6114-K220#S	A06B-6114-K220#S	N/A	N/A	N/A
N/A	N/A	A06B-6079-K812	A06B-6079-K812	A06B-6079-K815
N/A	N/A	A06B-6079-K811	A06B-6079-K811	A06B-6079-K814
N/A	N/A	A06B-6114-K213#E	A06B-6114-K213#E	A06B-6114-K213#E
N/A	N/A	A06B-6114-K213#S	A06B-6114-K213#S	A06B-6114-K213#S
A06B-6073-K250				
IC800BBK021				
IC800ABK001 (Note 2)				
A66L-6001-0023#L150R0				
A66L-6001-0023#L1R003				
A66L-6001-0023#L3R003				
A66L-6001-0026#L1R003				
A66L-6001-0026#L5R003				
A66L-6001-0026#L10R03				
A66L-6001-0026#L20R03				
A06B-6073-K214				
A81L-0001-0083#3C				
A81L-0001-0101#C				
A06B-6093-K001 (replacement battery for IC800BBK021 kit)				

Servo Amplifiers

β Series Servo Amplifiers

Ordering Information

The β series amplifiers can be ordered as individual components or as kits that include connectors and spare fuses. The kit is recommended for new installation while spare parts, or replacement units, should use the amplifier only model number.

To place an order for a complete servo system, select the Servo Motor that meets your application requirements, then select the amplifier kit, cables or connectors (customer built cables) and accessories.

β Series Servo Amplifier Kits*

Part Number	Kit Description	Kit Contents
IC800BPK012	12 Amp β Series Amplifier Package	βSVU1-12 Amplifier (A06B-6093-H101) Fuse (A06B-6073-K250) Connector Kit (all CX11 connectors) (A06B-6093-K305) 100 Watt Discharge Resistor (A06B-6093-H402) E-Stop connector, JX5 (A02B-0120-K301)
IC800BPK020	20 Amp β Series Amplifier Package	βSVU1-20 Amplifier (A06B-6093-H102) Fuse (A06B-6073-K250) Connector Kit (all CX11 connectors) (A06B-6093-K305) 100 Watt Discharge Resistor (A06B-6093-H402) E-Stop connector, JX5 (A02B-0120-K301)

*Amplifier kits provide all of the required components for complete installation; we strongly encourage kits be ordered for new systems. Separate amplifiers are available for spare or replacement units.

Amplifier and Motor Ordering Information

Model Number	β0.5/3000	β2/3000	β3/3000	β6/2000	αC12/2000	βM0.5/4000	βM1/4000
Servo Motor	A06B-0113-B075#7008	A06B-0032-B075#7008	A06B-0033-B075#7008	A06B-0034-B075#7008	A06B-0141-B075#7008	A06B-0115-B075#0008	A06B-0116-B075#0008
Servo Motor w/ Holding Brake	A06B-0113-B175#7008	A06B-0032-B175#7008	A06B-0033-B175#7008	A06B-0034-B175#7008	A06B-0141-B175#7008	A06B-0115-B175#0008	A06B-0116-B175#0008
Amplifier Kit	IC800BPK012	IC800BPK012	IC800BPK020	IC800BPK020	IC800BPK020	IC800BPK020	IC800BPK020
Amplifier Only	A06B-6093-H101	A06B-6093-H101	A06B-6093-H102	A06B-6093-H102	A06B-6093-H102	A06B-6093-H102	A06B-6093-H102

Cable and Accessories Ordering Information

Model Number	β0.5/3000	β2/3000	β3/3000	β6/2000	αC12/2000	βM0.5/4000	βM1/4000
Motor Encoder Feedback Cable (14 meters)*	IC800CBL022	IC800CBL023	IC800CBL023	IC800CBL023	CF3A-2MPB-0140-AZ	CFBA-0WPB-0140-AZ	CFBA-0WPB-0140-AZ
Motor Power Cable (14 meters)*	IC800CBL067	IC800CBL068	IC800CBL068	IC800CBL068	CP4B-1MPB-0140-AZ	CP8B-1WPB-0140-AZ	CP8B-1WPB-0140-AZ
Motor Holding Brake Power Cable (14 meters)	Not required	44C742238-004	44C742238-004	44C742238-004	44C742238-004	CB6N-5WPM-0140-AZ	CB6N-5WPM-0140-AZ
Motor Encoder Connector	A06B-6050-K120	A06B-6050-K115	A06B-6050-K115	A06B-6050-K115	44A730464-G38	A06B-6114-K200#E	A06B-6114-K200#E
Motor Power Connector	A06B-6050-K119	44A730464-G18	44A730464-G18	44A730464-G18	44A730464-G20	A06B-6114-K230#E	A06B-6114-K230#E
Connector for Holding Brake	Not required	44A730464-G26	44A730464-G26	44A730464-G26	44A730464-G26	A06B-6114-K232#E	A06B-6114-K232#E
Command Signal Cable	For use with DSM300: IC800CBL001 (1m) or IC800CBL002 (3m)						
Encoder Battery Kit	Same kit for all β Series Servo Systems: IC800BPK021						
External Regen Resistor	Same kit for all β Series Servo Systems: A06B-6093-H401, 30 ohm, 20 W A06B-6093-H402, 30 ohm, 100 W						
44B295864-001	Grounding Bar for up to 10 cables (A99L-0035-0001 Grounding Clamps Required)						
A99L-0035-0001	Cable Shield Grounding Clamps for 44B295864-001 Grounding Bar						
A06B-6073-K250	Spare 24 VDC Control Power Input Fuse						
A06B-6093-K001	Replacement Lithium Battery for Absolute Encoder Power Back-up						
A06B-6073-K214	Amplifier Encoder Connector (JF1)						

* All motor power and encoder cables are 14 meters long.

Holding Brake: For system designs which include a vertical axis that must hold its position when power is removed, a motor holding brake option is available. User supplied full-wave rectified 120VAC or 90VDC power is required (24VDC for βM Series). To connect to the power, the brake cable is required on all but the β0.5/3000 motors.

Encoder Battery Kit: All β Series Servo motors feature a built-in serial encoder that can be used in either incremental or absolute mode. In order to utilize the absolute capability, an optional encoder battery pack must be installed. This pack allows the encoder's position information to be retained so that the machine does not need to be referenced to

a home position every time power is restored to the system.

The battery pack offered includes a small lithium battery and case which snaps on to the bottom of the amplifier unit. The kit components are not sold separately.

Servo Motors

Servo Motor Performance for Demanding Applications

The GE Fanuc Servo motors are a rugged family of brushless servo motors covering a broad torque and speed range. These motors utilize high energy rare earth magnets for superior cost/performance ratio. Low inertia design provides high acceleration rates for improved machine cycle rates. The S-Series motors utilize serial encoder feedback and can be used with GE Fanuc SL or S2K Series servo amplifiers. MTR-Series motors use resolver feedback and are matched for use with the S2K family of amplifiers and controllers. The α Series and β Series motors use high resolution serial encoder feedback and are matched with α Series and β Series amplifiers.



S-Series Servo Motor

Servo Motor Features

- Models from 0.84-495 in-lb (0.095-56 Nm) continuous
- 2500 ppr differential quadrature encoder with serial commutation feedback on S-Series; rugged resolver feedback on MTR-Series; high resolution serial encoder feedback on α Series and β Series.
- Brushless design minimizes electromagnetic interference, carbon dust and maintenance
- NEMA and metric servo mounting configurations
- Optional electrically released holding brakes
- Rugged TENV housing with IP55 to IP67 protection rating
- 1-5 kW S-Series models and all MTR-Series models include MS-style connectors
- Some models include integral shaft oil seal
- Absolute feedback available on α Series and β Series



Servo Motors

Servo Motors

Feature Comparison

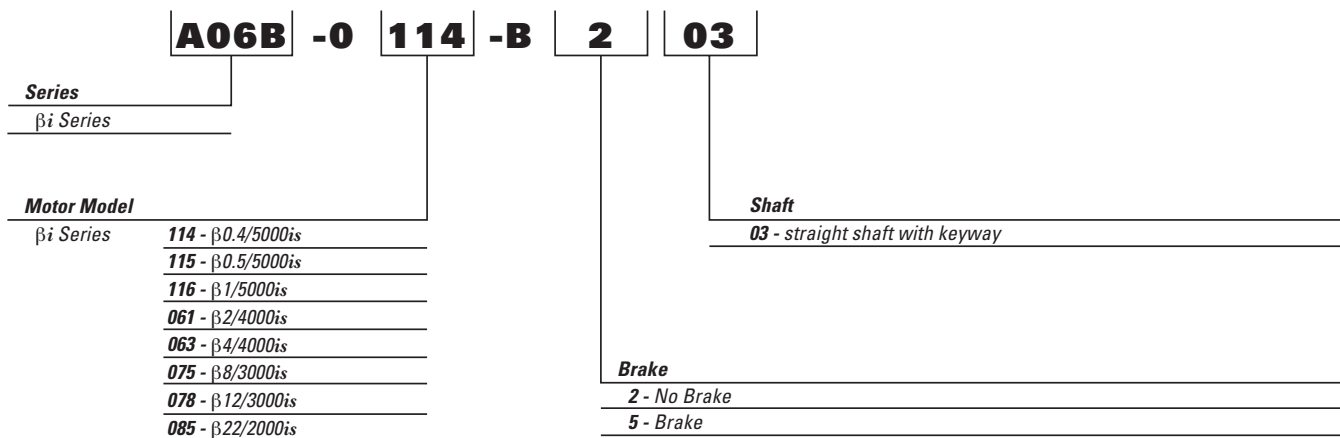
Feature	Units	α Series	β Series	S-Series	MRT-3T Series
Cont. Stall Torque Range	In-lb (Nm)	53-495 (6-56)	4.4-53 (0.5-6)	0.84-322 (0.09-36.3)	2.7-477 (0.3-53.9)
Cont. Speed Range	RPM	2000-3000	2000-4000	2000-3000	950-9000
Max. Speed Range	RPM	2000-4000	2000-5000	3000-5000	1300-12900
Compatible Amplifiers		α Series	β Series	SL Series & S2K Series	S2K Series
Compatible Controllers		DSM	DSM	DSM/S2K	DSM/S2K
Mounting		Metric	Metric	NEMA: 30-1000 W Metric: 1kW-5kW	Metric
Shaft Configuration		Straight/Keyway	Straight/Keyway	Straight/Keyway	Straight/No Keyway
Brushless Construction		Yes	Yes	Yes	Yes
Optional Brake		90 VDC	90 VDC	24 VDC	24 VDC
Feedback Type		Serial Encoder	Serial Encoder	Serial Encoder	Resolver
Feedback Resolution	Counts/rev	64 K	32 K	10,000	4096
Absolute Feedback		Yes*	Yes*	No	No
Line Voltage		230 VAC 3 ϕ	230 VAC 1 or 3 ϕ	115 VAC 1 ϕ 230 VAC 1 or 3 ϕ	115 VAC 1 ϕ 230 VAC 1 or 3 ϕ 460 VAC 3 ϕ
Shaft Seal		Standard	Standard	No	MTR-3T10 Series MTR-3T20 Series
Protection Rating		IP55 Standard IP67 Optional	IP55	IP65	IP65
Inertia		High	High	Medium	Medium

*Absolute feedback requires optional encoder battery backup for α Series or β Series amplifier.

Servo Motors

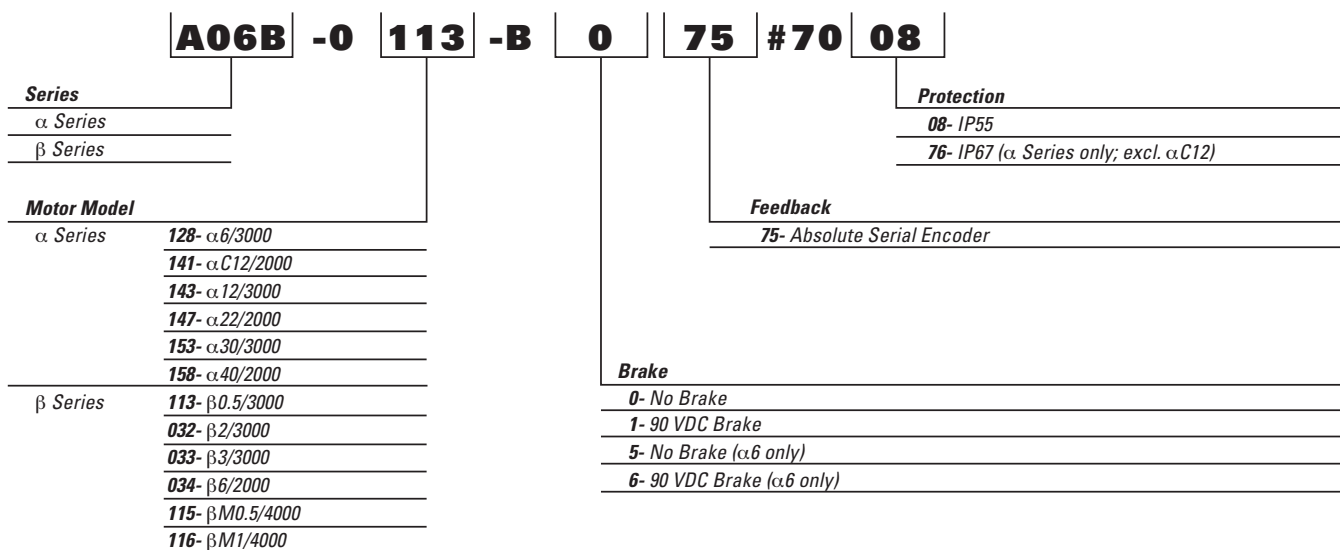
β is Series Servo Motors

Motor Part Numbers



α Series and β Series Servo Motors

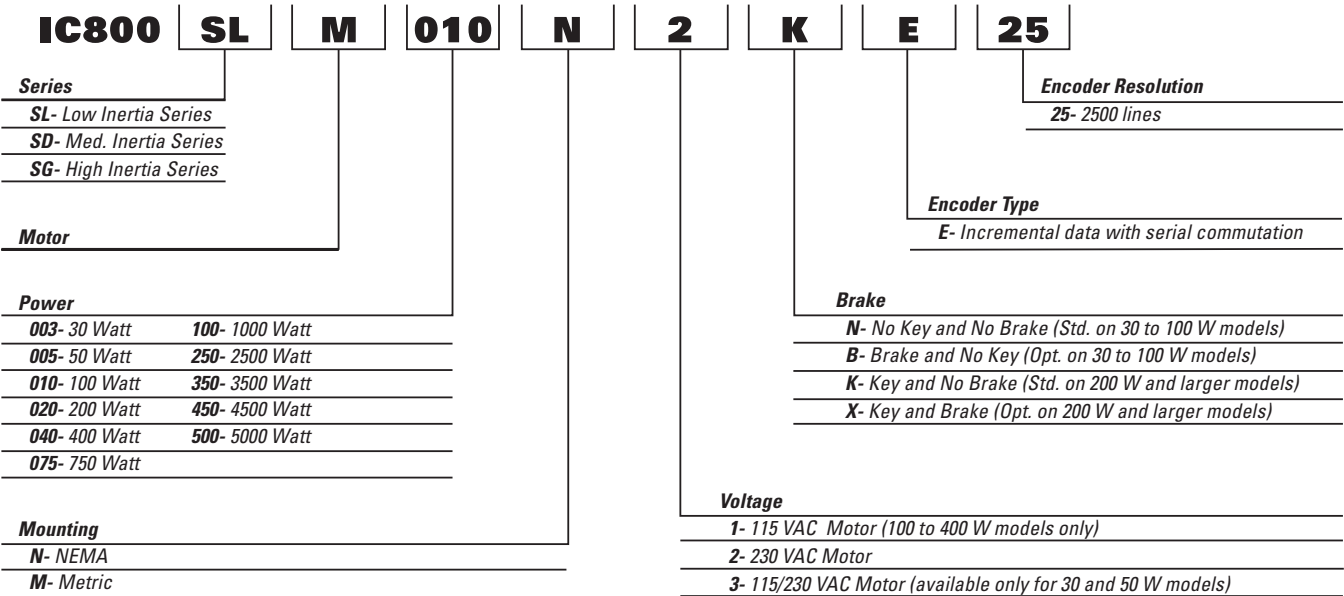
Motor Part Numbers



Servo Motors

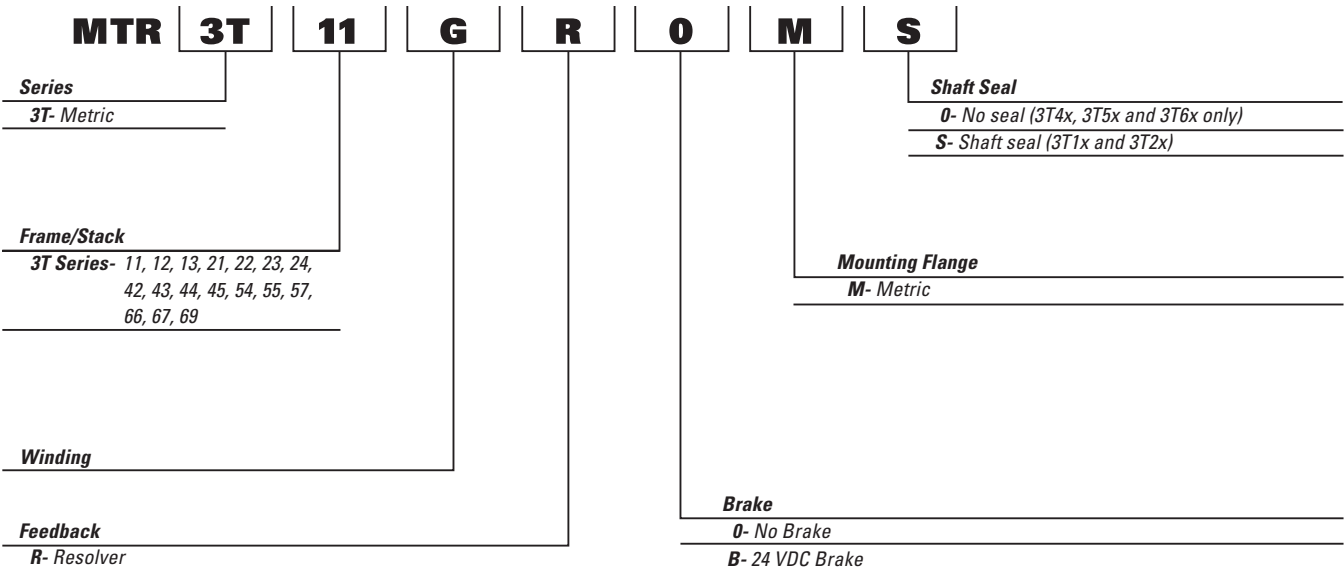
S-Series Servo Motors

Motor Part Numbers



MTR-Series

Motor Part Numbers



Servo Motors

S-Series Servo Motors

Specifications (30-750 W Models)

Specification	Units	SLM003	SLM005	SLM010		SLM020		SLM040		SLM075
Voltage	VAC	115/230 V	115/230 V	115 V	230 V	115 V	230 V	115 V	230 V	230 V
Output Power	W	30	50	100		200		400		750
Continuous Stall Torque*	in-lb [Nm]	0.84 [0.095]	1.42 [0.16]	2.83 [0.32]		5.66 [0.64]		11.5 [1.3]		21.2 [2.4]
Peak Torque with SL	in-lb [Nm]	2.48 [0.28]	4.25 [0.48]	8.0 [0.95]		16.9 [1.91]		33.6 [3.8]		46.0 [5.2]
Peak Torque with S2K	in-lb [Nm]	2.48 [0.28]	4.25 [0.48]	8.4 [0.95]		17 [1.92]		34 [3.84]		46.0 [5.2]
Rated Speed	RPM	3000	3000	3000		3000		3000		3000
Maximum Speed	RPM	5000	5000	5000		5000		5000		4500
Feedback	2500 lines (10,000 counts/rev) Incremental Encoder (5 VDC±5% @ 0.3 A; 250 kHz max.)									
Weight	lb [kg]	0.59 [0.27]	0.75 [0.34]	1.23 [0.56]		2.2 [1.0]		3.52 [1.6]		7.0 [3.2]
Rotor Inertia	in-lb-s ² x 10 ⁻⁴ [kg-m ² x 10 ⁻⁴]	0.139 [0.016]	0.225 [0.025]	0.546 [0.062]		1.474 [0.17]		3.208 [0.36]		11.62 [1.31]
Shaft Thrust Load	lb [kg]	6.6 [3]	13.2 [6]	13.2 [6]		22 [10]		22 [10]		33 [15]
Shaft Radial Load†	lb [kg]	11 [5]	15.4 [7]	15.4 [7]		55 [25]		55 [25]		88 [40]
Mechanical Time Constant	ms	1.8	1.2	0.8	0.77	0.62	0.63	0.48	0.54	0.45
Torque Constant	in-lb/A _{rms} [Nm/A _{rms}]	0.91 [0.103]	1.42 [0.16]	1.86 [0.21]	3.28 [0.37]	2.39 [0.27]	3.72 [0.42]	2.66 [0.30]	4.78 [0.54]	5.4 [0.61]
Resistance (phase)	Ω	4.0	4.2	1.9	5.7	0.91	2.3	0.41	1.46	0.43
Inductance (phase)	mH	2.4	2.8	1.7	5.0	3.2	7.8	1.9	5.1	3.2
Electrical Time Constant	ms	0.6	0.67	0.89	0.88	3.5	3.4	4.6	3.5	7.4
Continuous Current	A _{rms}	1.0	1.0	1.6	1.0	2.5	1.6	4.3	2.5	4.3

Optional Brake Data @ 20°C (backlash = ± 0.1°)

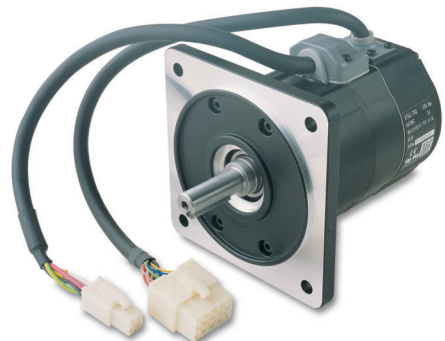
Inertia Adder	in-lb-s ² x 10 ⁻⁴ [kg-m ² x 10 ⁻⁴]	0.026 [0.003]	0.026 [0.003]	0.026 [0.003]	0.26 [0.03]	0.26 [0.03]	0.78 [0.09]
Weight Adder	lb [kg]	0.44 [0.2]	0.42 [0.19]	0.44 [0.2]	0.88 [0.4]	0.88 [0.4]	1.54 [0.7]
Voltage	VDC±10%	24	24	24	24	24	24
Current	A	0.26	0.26	0.26	0.36	0.36	0.43
Engage Time	ms	≤25	≤25	≤25	≤50	≤50	≤60
Release Time	ms	≤20	≤20	≤20	≤15	≤15	≤15
Torque	in-lb [Nm]	2.6 [0.29]	2.6 [0.29]	2.6 [0.29]	10.8 [1.3]	10.8 [1.3]	21.7 [2.5]

*Torque shown is available up to a certain Ambient Temperature. See Speed/Torque curve notes.

†Radial shaft loads are specified at a position centered along the length of the shaft. Motor data shown for 20°C unless otherwise noted.

Environmental Specifications (all S-Series models)

Relative Humidity	85% non-condensing
Ambient Temperature	0 to 40°C operating
Storage Temperature	-20 to 80°C
Vibration	5 G
Shock	10 G



Servo Motors

S-Series Servo Motors

Specifications (1-5 kW Models)

Specification	Units	SLM100	SDM100	SLM250	SDM250	SLM350	SLM500	SDM500	SGM450
Voltage	VAC	230 V	230 V	230 V	230 V	230 V	230 V	230 V	230 V
Output Power	W	1000	1000	2500	2500	3500	5000	5000	5000
Continuous Stall Torque*	in-lb [Nm]	28 [3.18]	43 [4.8]	70 [7.94]	104 [11.8]	97 [11]	140 [15.8]	210 [23.8]	322 [36.3]
Peak Torque with SL	in-lb [Nm]	84 [9.5]	n/a	210 [23.8]	n/a	294 [33.2]	421 [47.6]	n/a	n/a
Peak Torque with S2K	in-lb [Nm]	56 [6.3]	110 [12.4]	140 [15.8]	240 [27.1]	252 [28.5]	282 [31.9]	420 [47.5]	644 [72.8]
Rated Speed	RPM	3000	2000	3000	2000	3000	3000	2000	2000
Maximum Speed	RPM	5000	3000	5000	3000	5000	4500	3000	3000
Feedback	2500 lines (10,000 counts/rev) Incremental Encoder (5 VDC±5% @ 0.3 A; 250 kHz max.)								
Weight	lb [kg]	9.9 [4.5]	15 [6.8]	16.5 [7.5]	28.2 [12.8]	24 [10.9]	38 [17.3]	55 [25]	38 [17.3]
Rotor Inertia	in-lb-s ² × 10 ⁻⁴ [kg-m ² × 10 ⁻⁴]	14.91 [1.69]	54.6 [6.17]	38.14 [4.31]	169.9 [19.2]	69.92 [7.90]	157.5 [17.8]	537.2 [60.7]	716 [80.9]
Shaft Thrust Load	lb [kg]	33 [15]	44 [20]	44 [20]	77 [35]	44 [20]	77 [35]	77 [35]	77 [35]
Shaft Radial Load†	lb [kg]	88 [40]	110 [50]	110 [50]	176 [80]	110 [50]	176 [80]	176 [80]	176 [80]
Mechanical Time Constant	ms	0.78	0.70	0.52	0.72	0.45	0.46	0.9	0.46
Torque Constant	in-lb/Arms [Nm/Arms]	3.9 [0.44]	7.61 [0.86]	4.34 [0.49]	7.52 [0.85]	4.51 [0.51]	5.04 [0.57]	7.52 [0.85]	11.5 [1.3]
Resistance (phase)	Ω	0.27	0.56	0.1	0.18	0.05	0.028	0.068	0.028
Inductance (phase)	mH	1.8	10.0	1.1	3.8	1	1.12	2.2	0.56
Electrical Time Constant	ms	6.7	18	11	21	20	20	32	20
Continuous Current	Arms	7.2	5.6	15.9	14	21.6	28	28	28.5

Optional Brake Data @ 20°C (backlash = ± 0.1°)

Inertia Adder	in-lb-s ² × 10 ⁻⁴ [kg-m ² × 10 ⁻⁴]	2.25 [0.26]	5.49 [0.62]	3.81 [0.43]	16.82 [1.9]	6.99 [0.79]	16.82 [1.9]	53.1 [6]	16.82 [1.9]
Weight Adder	lb [kg]	1.32 [0.6]	4.2 [1.9]	3.08 [1.4]	4.2 [1.9]	3.74 [1.7]	4.18 [1.9]	7.7 [3.5]	4.18 [1.9]
Voltage	VDC±10%	24	24	24	24	24	24	24	24
Current	A±10%	0.74	0.59	0.81	0.9	0.81	0.90	1.30	0.90
Engage Time	ms	≤50	≤80	≤50	≤110	≤80	≤110	≤80	≤110
Release Time	ms	≤15	≤70	≤15	≤50	≤15	≤50	≤25	≤50
Torque	in-lb [Nm]	43.3 [4.9]	43.3 [4.9]	69 [7.8]	143 [16.1]	104 [11.8]	143 [16.2]	217 [24.5]	143 [16.2]

Motor data shown for 20°C unless otherwise noted.

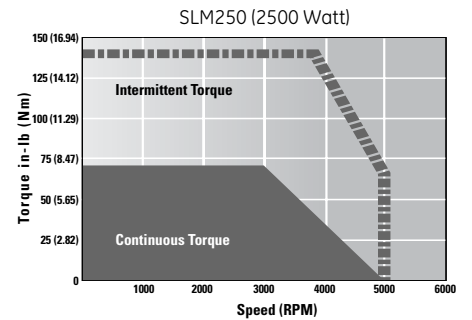
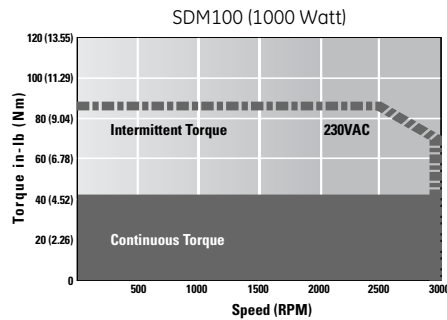
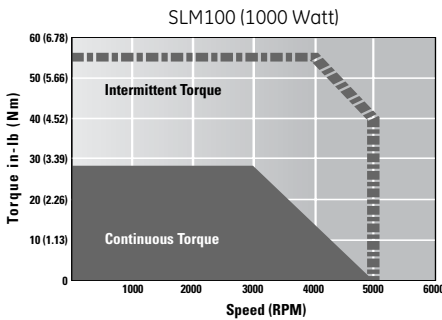
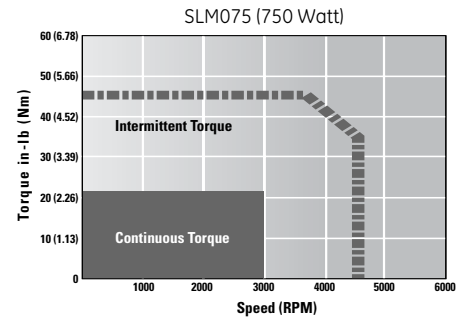
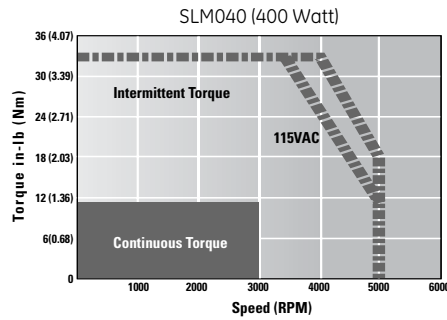
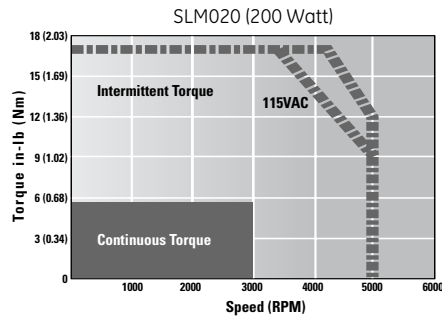
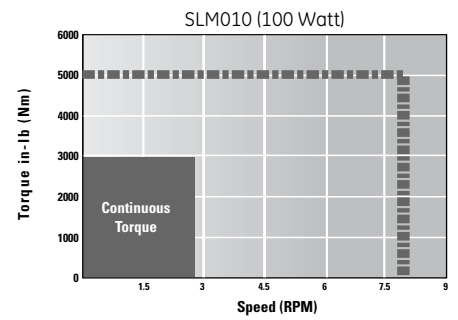
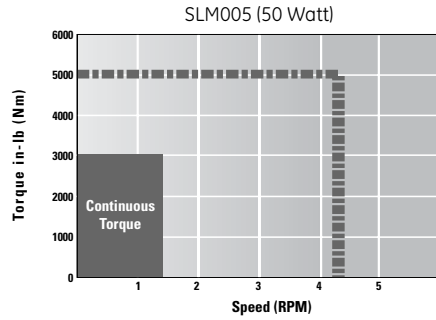
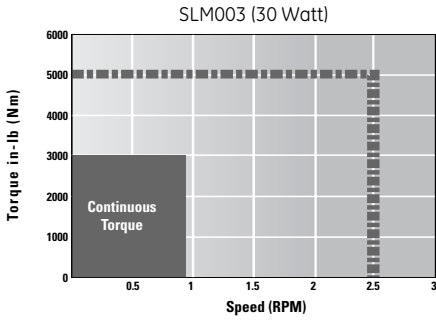
*Torque shown is available up to a certain Ambient Temperature. See Speed/Torque curve notes.

†Radial shaft loads are specified at a position centered along the length of the shaft.



S-Series Servo Motors

Speed Torque Curves with S2K Amplifier/Controllers



Note:

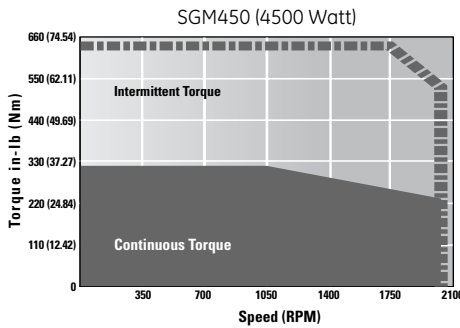
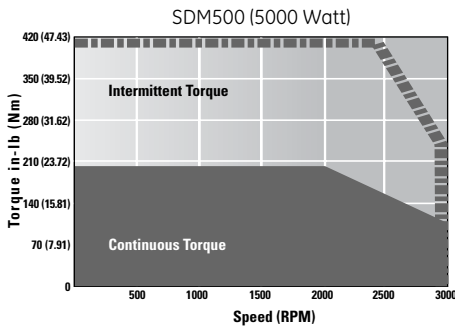
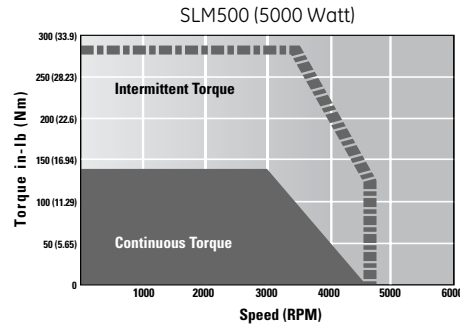
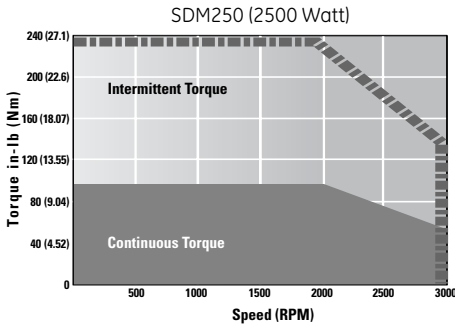
Continuous torque shown in curves available at:

- | | |
|---------------|---------------|
| SLM003 = 40°C | SLM040 = 20°C |
| SLM075 = 40°C | SLM250 = 20°C |
| SLM100 = 40°C | SLM500 = 20°C |
| SDM100 = 40°C | SLM350 = 25°C |
| SDM250 = 40°C | SLM020 = 30°C |
| SGM450 = 40°C | SDM500 = 35°C |
| SLM005 = 20°C | |

For derating at higher ambient temperatures contact GE Fanuc.

S-Series Servo Motors

Speed Torque Curves with S2K Amplifier/Controllers (continued)



Note:

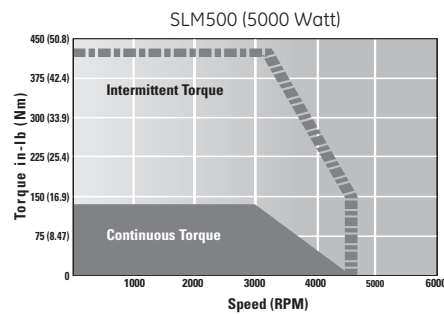
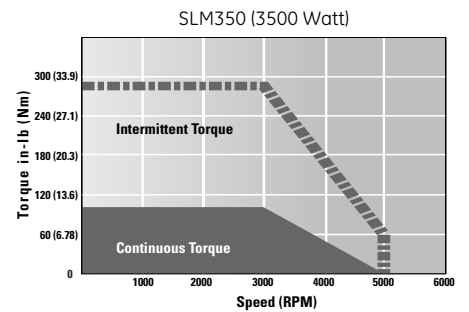
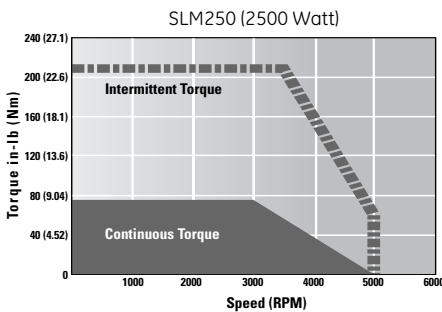
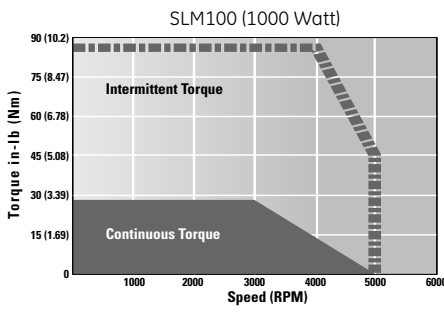
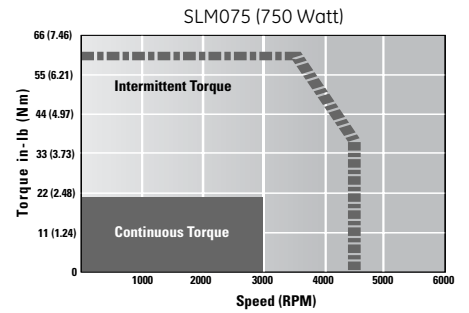
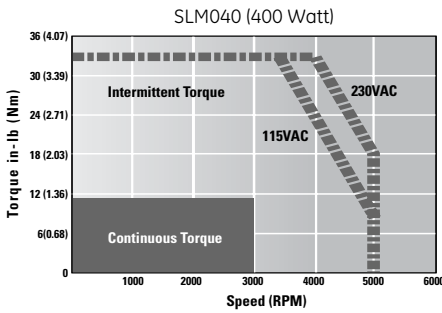
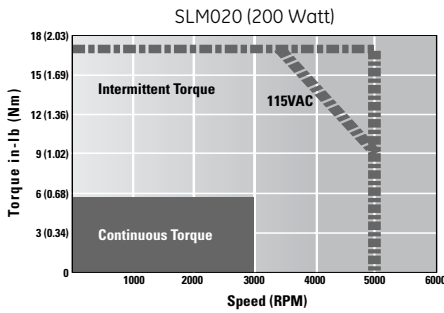
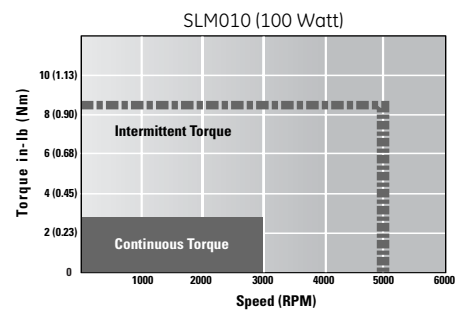
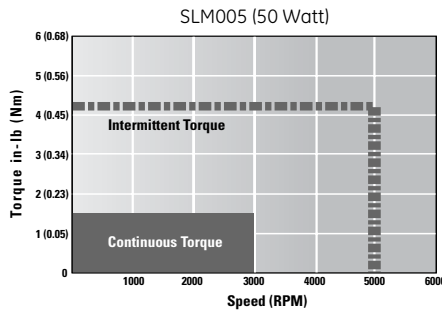
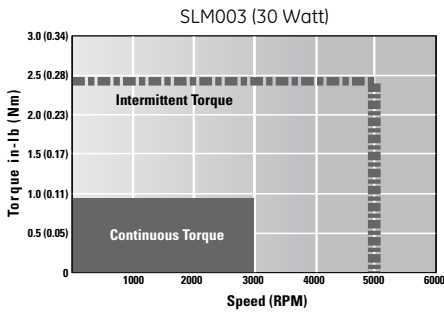
Continuous torque shown in curves available at:

- | | |
|---------------|---------------|
| SLM003 = 40°C | SLM040 = 20°C |
| SLM075 = 40°C | SLM250 = 20°C |
| SLM100 = 40°C | SLM500 = 20°C |
| SDM100 = 40°C | SLM350 = 25°C |
| SDM250 = 40°C | SLM020 = 30°C |
| SGM450 = 40°C | SDM500 = 35°C |
| SLM005 = 20°C | |

For derating at higher ambient temperatures contact GE Fanuc.

S-Series Servo Motors

Speed Torque Curves with SL Amplifiers



Note:

Continuous torque shown in curves available at:

SLM003 = 40°C	SLM250 = 20°C
SLM075 = 40°C	SLM500 = 20°C
SLM100 = 40°C	SLM010 = 30°C
SLM005 = 20°C	SLM020 = 30°C
SLM040 = 20°C	SLM350 = 25°C

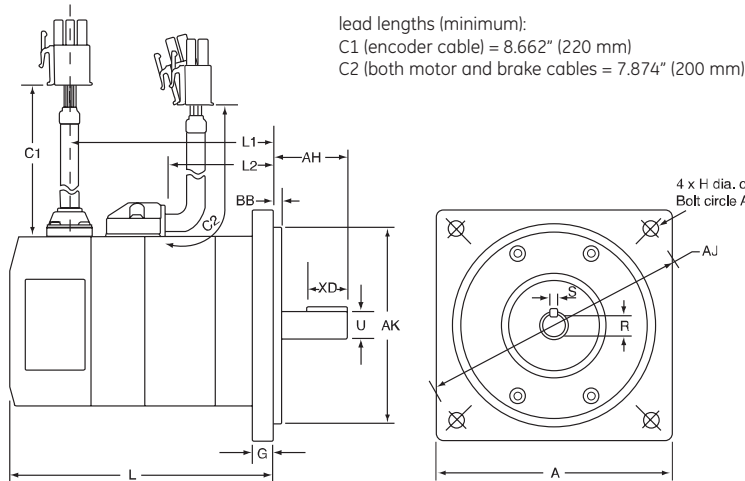
For derating at higher ambient temperatures contact GE Fanuc.

S-Series Servo Motors

Dimensions (30-750 W Models)

Dimension	SLM003 (30 W) in (mm)	SLM005 (50 W) in (mm)	SLM010 (100 W) in (mm)	SLM020 (200 W) in (mm)	SLM040 (400 W) in (mm)	SLM075 (750 W) in (mm)
A	2.27 ± 0.024 (57.658 ± 0.6)	2.27 ± 0.024 (57.658 ± 0.6)	2.27 ± 0.024 (57.658 ± 0.6)	3.42 ± 0.024 (86.868 ± 0.6)	3.42 ± 0.024 (86.868 ± 0.6)	3.42 ± 0.024 (86.868 ± 0.6)
AH	0.7874 ± 0.028 (20 ± 0.7)	0.7874 ± 0.028 (20 ± 0.7)	0.7874 ± 0.028 (20 ± 0.7)	1.181 ± 0.028 (30 ± 0.7)	1.181 ± 0.028 (30 ± 0.7)	1.181 ± 0.028 (30 ± 0.7)
AJ	2.625 ± 0.024 (66.675 ± 0.6)	2.625 ± 0.024 (66.675 ± 0.6)	2.625 ± 0.024 (66.675 ± 0.6)	3.875 ± 0.024 (98.425 ± 0.6)	3.875 ± 0.024 (98.425 ± 0.6)	3.875 ± 0.024 (98.425 ± 0.6)
AK	1.502 ⁺⁰ _{-0.001} (38.1508 ⁺⁰ _{-0.025})	1.502 ⁺⁰ _{-0.001} (38.1508 ⁺⁰ _{-0.025})	1.502 ⁺⁰ _{-0.001} (38.1508 ⁺⁰ _{-0.025})	2.877 ⁺⁰ _{-0.0012} (73.0758 ⁺⁰ _{-0.030})	2.877 ⁺⁰ _{-0.0012} (73.0758 ⁺⁰ _{-0.030})	2.877 ⁺⁰ _{-0.0012} (73.0758 ⁺⁰ _{-0.030})
BB	0.118 ± 0.008 (3 ± 0.2)	0.118 ± 0.008 (3 ± 0.2)	0.118 ± 0.008 (3 ± 0.2)	0.118 ± 0.008 (3 ± 0.2)	0.118 ± 0.008 (3 ± 0.2)	0.118 ± 0.008 (3 ± 0.2)
G	0.236 ± 0.012 (6 ± 0.3)	0.236 ± 0.012 (6 ± 0.3)	0.236 ± 0.012 (6 ± 0.3)	0.315 ± 0.012 (8 ± 0.3)	0.315 ± 0.012 (8 ± 0.3)	0.315 ± 0.012 (8 ± 0.3)
H	0.1968 ± 0.010 (5 ± 0.25)	0.1968 ± 0.010 (5 ± 0.25)	0.1968 ± 0.010 (5 ± 0.25)	0.2165 ± 0.010 (5.5 ± 0.25)	0.2165 ± 0.010 (5.5 ± 0.25)	0.2165 ± 0.010 (5.5 ± 0.25)
U	0.25 ⁺⁰ _{-0.0004} (6.35 ⁺⁰ _{-0.009})	0.25 ⁺⁰ _{-0.0004} (6.35 ⁺⁰ _{-0.009})	0.25 ⁺⁰ _{-0.0004} (6.35 ⁺⁰ _{-0.009})	0.375 ⁺⁰ _{-0.0004} (9.5250 ⁺⁰ _{-0.009})	0.375 ⁺⁰ _{-0.0004} (9.5250 ⁺⁰ _{-0.009})	0.625 ⁺⁰ _{-0.0004} (15.875 ⁺⁰ _{-0.011})
L	2.559 (65)	2.874 (73)	4.055 (103)	3.701 (94)	4.862 (123.5)	5.610 (142.5)
L (with Brake)	3.819 (97)	4.134 (105)	5.315 (135)	5.000 (127)	6.161 (156.5)	6.988 (177.5)
L1	1.772 (45)	2.087 (53)	3.268 (83)	2.854 (72.5)	4.016 (102)	4.764 (121)
L1 (with Brake)	3.031 (77)	3.346 (85)	4.528 (115)	4.154 (105.5)	5.315 (135)	6.142 (156)
L2 (with or w/o Brake)	0.709 (18)	1.024 (26)	2.205 (56)	1.535 (39)	2.697 (68.5)	3.346 (85)
R (bottom of keyway)	n/a	n/a	n/a	0.3018 ⁺⁰ _{-0.015} (7.666 ⁺⁰ _{-0.381})	0.3018 ⁺⁰ _{-0.015} (7.666 ⁺⁰ _{-0.381})	0.5165 ⁺⁰ _{-0.015} (13.120 ⁺⁰ _{-0.383})
S	n/a	n/a	n/a	0.125 ⁺⁰ _{-0.002} (3.175 ⁺⁰ _{-0.051})	0.125 ⁺⁰ _{-0.002} (3.175 ⁺⁰ _{-0.051})	0.1885 ⁺⁰ _{-0.002} (4.788 ⁺⁰ _{-0.051})
XD	n/a	n/a	n/a	0.75 ⁺⁰ _{-0.016} (19.050 ⁺⁰ _{-0.4})	0.75 ⁺⁰ _{-0.016} (19.050 ⁺⁰ _{-0.4})	0.952 ⁺⁰ _{-0.016} (24.200 ⁺⁰ _{-0.4})

S-Series Servo Motor Dimensions: 30-750 W Motors

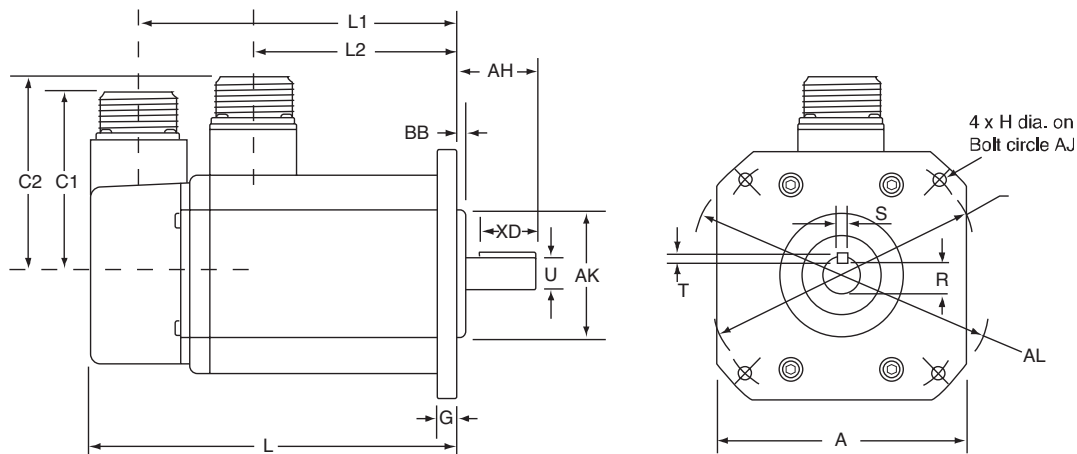


S-Series Servo Motors

Dimensions 1-5 kW Models

Dimension	SLM100 (1 kW) in (mm)	SDM100 (1 kW) mm	SLM250 (2.5 kW) mm	SDM250 (2.5 kW) mm	SLM350 (3.5 kW) mm	SLM500 (5 kW) mm	SDM500 (5 kW) mm	SGM450 (4.5 kW) mm
A	4.38 (111.25)	130	100	130	120	130	176	176
AH	1.378 (35)	55	55	65	55	65	70	113
AJ	4.95 (125.73)	145	115	145	130/145	145	200	200
AK	2.188 ⁺⁰ / _{-0.004} (55.575 ⁺⁰ / _{-0.1})	110 ⁺⁰ / _{-0.035}	95 ⁺⁰ / _{-0.035}	110 ⁺⁰ / _{-0.035}	110 ⁺⁰ / _{-0.035}	110 ⁺⁰ / _{-0.035}	114.3 ⁺⁰ / _{-0.035}	114.3 ⁺⁰ / _{-0.035}
AL	5.512 (140)	165	135	165	162	165	233	233
BB	0.118 (3)	6	3	6	3	6	3.2	3.2
G	0.394 (10)	12	10	12	12	12	18	24
H	0.260 (6.6)	9	9	9	9	9	13.5	13.5
U	0.625 ⁺⁰ / _{-0.0005} (15.875 ⁺⁰ / _{-0.013})	22 ⁺⁰ / _{-0.013}	19 ⁺⁰ / _{-0.013}	24 ⁺⁰ / _{-0.013}	22 ⁺⁰ / _{-0.013}	24 ⁺⁰ / _{-0.013}	35 ⁺⁰ / _{-0.016}	42 ⁺⁰ / _{-0.016}
CI	3.31 (84)	84	84	84	84	84	84	84
C2	3.62 (92)	112	97	112	111	119	143	143
L	6.890 (175)	150	227	225	234	277	222	289
L (with Brake)	7.874 (200)	175	252	250	259	302	247	337.5
L1	6.012 (155)	130	207	205	214	257	202	269
L1 (with Brake)	7.087 (180)	155	232	230	239	282	227	317.5
L2	3.858 (98)	75	153	150	160	202	145	212
L2 (with Brake)	4.843 (123)	100	178	175	185	227	170	260.5
R (bottom of keyway)	0.5165 ⁺⁰ / _{-0.015} (13.120 ⁺⁰ / _{-0.383})	18	15.5	20	18	20	30	37 ⁺⁰ / _{-0.2}
S	0.1885 ⁺⁰ / _{-0.002} (4.788 ⁺⁰ / _{-0.051})	8 ⁺⁰ / _{-0.036}	6 ⁺⁰ / _{-0.036}	8 ⁺⁰ / _{-0.036}	8 ⁺⁰ / _{-0.036}	8 ⁺⁰ / _{-0.036}	10 ⁺⁰ / _{-0.036}	12 ⁺⁰ / _{-0.043}
T	0.1885 (4.788)	7	6	7	7	7	7	8
XD	1.000 (25.4)	41	42	41	41	51	50	90

S-Series Servo Motor Dimensions: 1-5 kW Motors

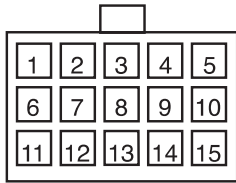


Servo Motors

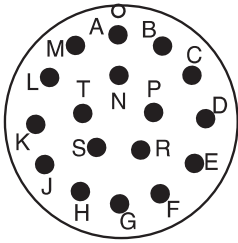
S-Series Servo Motors

Encoder Connections

Motor Encoder Feedback Connectors



30-750 W Motor Encoder Connector (front view)



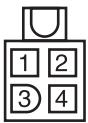
1-5 kW Motor Encoder Connector (front view)

Encoder Feedback Connections

Connect From...		Connect To...	
S2K Position Feedback Connector Pin Number	Signal Name	30-750 W S-Series Encoder Connector	1-5 kW S-Series Encoder Connector
1	A+	1	A
2	B+	3	C
3	Z+	5	E
4	RX	11	P
5	+5V	13	H
6	GND	14	G
7	NC	NC	NC
8	NC	NC	NC
9	A-	2	B
10	B-	4	D
11	Z-	6	F
12	TX	12	R
13	+5V	13	H
14	GND	14	G
15	Shield	15	J

Note: The S-Series motors include a proprietary serial encoder interface (RX, TX) to determine the motor rotor position in order to properly commutate the motor currents. GE Fanuc S-Series motors can only be used with GE Fanuc SL-Series or S2K Series amplifiers.

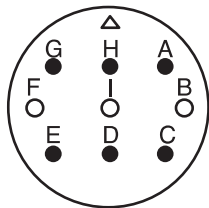
Servo Motor Power and Brake Wiring and Grounding



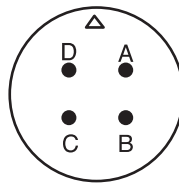
30-750 W Motor (front view)



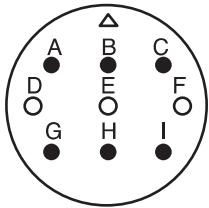
30-750 W Brake (front view)



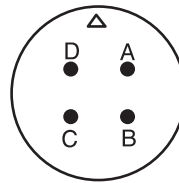
1, 2.5 & 4.5 kW with brake (front view)



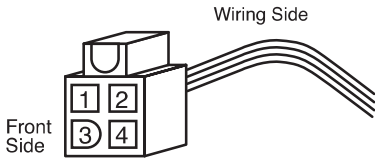
1, 2.5 & 4.5 kW without brake (front view)



3.5 & 5 kW with brake (front view)



3.5 & 5 kW without brake (front view)



Connector View Definition

S-Series Motor Power Connections

30-750 W Motor Power

Pin No.	Signal
1	T (U)
2	R (V)
3	S (W)
4	GND

30-750 W Brake

Pin No.	Signal
1	Brake
2	Brake

1-2.5 & 4.5 kW with Brake

Pin No.	Pin No.
A&C	NC
E&D	GND
B	S (W)
I	R (V)
F	T (U)
G&H	Brake

3.5 & 5 kW with Brake

Signal	Signal
A&B	Brake
C&I	NC
D	T (U)
E	R (V)
F	S (W)
G&H	GND

1-5 kW without Brake

Pin No.	Signal
A	T (U)
B	R (V)
C	S (W)
D	GND

Motion Solutions

Servo Motors

S-Series Servo Motors

Ordering Information

Part Number		Description	SL Amplifier	S2K Amplifier	S2K Controller
No Brake	Brake				
IC800SLM003N3NE25	IC800SLM003N3BE25	0.84 in-lb 30 W, 115/230 V, IP65, NEMA 23	IC800SLA0031 IC800SLA0032	IC800SSD104S1	IC800SSI104S1 IC800SSI104D2
IC800SLM005N3NE25	IC800SLM005N3BE25	1.42 in-lb 50 W, 115/230 V, IP65, NEMA 23	IC800SLA0051 IC800SLA0052		IC800SSI104P2
IC800SLM010N1NE25	IC800SLM010N1BE25	2.83 in-lb 100 W, 115 V, IP65, NEMA 23	IC800SLA0101		
IC800SLM010N2NE25	IC800SLM010N2BE25	2.83 in-lb 100 W, 230 V, IP65, NEMA 23	IC800SLA0102		
IC800SLM020N1KE25	IC800SLM020N1XE25	5.7 in-lb 200 W, 115 V, IP65, Key, NEMA 34	IC800SLA0201		
IC800SLM020N2KE25	IC800SLM020N2XE25	5.7 in-lb 200 W, 230 V, IP65, Key, NEMA 34	IC800SLA0202		
IC800SLM040N1KE25	IC800SLM040N1XE25	11.5 in-lb 400 W, 115 V, IP65, Key, NEMA 34	IC800SLA0401		
IC800SLM040N2KE25	IC800SLM040N2XE25	11.5 in-lb 400 W, 230 V, IP65, Key, NEMA 34	IC800SLA0402		
IC800SLM075N2KE25	IC800SLM075N2XE25	21.2 in-lb 750 W, 230 V, IP65, Key, NEMA 34	IC800SLA0752		
IC800SLM100N2KE25	IC800SLM100N2XE25	28 in-lb 1 kW, 230 V, IP65, Key, Oil Seal, NEMA 42	IC800SLA1002	IC800SSD107S1	IC800SSI107S1
IC800SDM100M2KE25	IC800SDM100M2XE25	43 in-lb 1 kW, 230 V, IP65, Key, Oil Seal, Metric	n/a		IC800SSI107D2 IC800SSI107P2
IC800SLM250M2KE25	IC800SLM250M2XE25	70 in-lb 2.5 kW, 230 V, IP65, Key, Oil Seal, Metric	IC800SLA2502	IC800SSD216S1	IC800SSI216D2
IC800SDM250M2KE25	IC800SDM250M2XE25	104 in-lb 2.5 kW, 230 V, IP65, Key, Oil Seal, Metric	n/a		IC800SSI216P2
IC800SLM350M2KE25	IC800SLM350M2XE25	97 in-lb 3.5 kW, 230 V, IP65, Key, Oil Seal, Metric	IC800SLA3502		
IC800SLM500M2KE25	IC800SLM500M2XE25	140 in-lb 5 kW, 230 V, IP65, Key, Oil Seal, Metric	IC800SLA5002	IC800SSD228S1	IC800SSI228P2
IC800SDM500M2KE25	IC800SDM500M2XE25	210 in-lb 5 kW, 230 V, IP65, Key, Oil Seal, Metric	n/a		IC800SSI228D2
IC800SGM450M2KE25	IC800SGM450M2XE25	322 in-lb 4.5 kW, 230 V, IP65, Key, Oil Seal, Metric	n/a		

For motor cable information please refer to the applicable amplifier or controller section.

Connector Mate Kits

Kit Part Number	Description
IC800SLMCONKITZ	Encoder Connector, 30 to 750 Watt S-Series Motors without Brake Power Connector, 30 to 750 Watt S-Series Motors without Brake
IC800SLMCONKITZB	Encoder Connector, 30 to 750 Watt S-Series Motors with Brake Power Connector, 30 to 750 Watt S-Series Motors with Brake Brake Connector, 30 to 750 Watt S-Series Motors with Brake
IC800SLMCONKITV	Encoder Connector, 1000 to 2500 Watt S-Series Motors without Brake Power Connector, 1000 to 2500 Watt S-Series Motors without Brake
IC800SLMCONKITVB	Encoder Connector, 1000 to 2500 Watt S-Series Motors with Brake Power & Brake Connector, 1000 to 2500 Watt S-Series Motors with Brake
IC800SLMCONKITVL	Encoder Connector, 3500 to 5000 Watt S-Series Motors without Brake Power Connector, 3500 to 5000 Watt S-Series Motors without Brake
IC800SLMCONKITVLB	Encoder Connector, 3500 to 5000 Watt S-Series Motors with Brake Power & Brake Connector, 3500 to 5000 Watt S-Series Motors with Brake



Servo Motors

MTR-3T Series Servo Motors

Specifications

Specifications	Units	3T11-G	3T12-G	3T13-G	3T21-G	3T22-G	3T23-G	3T24-H	3T42-H	3T43-H	3T43-J	3T44-J
Continuous Stall Torque ¹	in-lb (Nm)	2.7 (0.30)	5.3 (0.6)	8 (0.9)	5.3 (0.60)	11.5 (1.3)	17.7 (2.0)	23.0 (2.6)	36.3 (4.1)	50.4 (5.7)	54.0 (6.1)	72 (8.13)
Peak Torque ³	in-lb (Nm)	9.3 (1.05)	20.8 (2.35)	24.6 (2.78)	19.9 (2.25)	35.5 (4.01)	53.5 (6.05)	58.2 (6.58)	105.8 (11.9)	100 (11.3)	106.7 (12.06)	143.6 (16.23)
Rated Speed:												
@120 VAC input	RPM	3,500	4,250	4,500	3,025	2,325	1,800	1,500	1,475	925	1,500	1,050
@240 VAC input		7,000	8,500	9,000	6,050	4,650	3,600	3,000	2,950	1,850	3,000	2,100
@480 VAC input		n/a	n/a	n/a	n/a	n/a	n/a	n/a	5,900	n/a	6,800	5,100
No-load Speed:												
@120 VAC input	RPM	6,450	5,400	5,300	4,625	3,550	2,350	2,175	2,000	1,300	2,025	1,500
@240 VAC input		12,900	10,800	10,600	9,250	7,100	4,700	4,350	4,000	2,600	4,050	3,000
@480 VAC input		n/a	n/a	n/a	n/a	n/a	n/a	n/a	7,900	n/a	8,100	6,000
Feedback	4096 counts/rev resolver (control transmitter; 0.5 transformation ratio)											
Weight	lb (kg)	2.6 (1.2)	3.3 (1.5)	4.2 (1.9)	3.7 (1.7)	5.0 (2.3)	6.4 (2.9)	7.7 (3.5)	136 (6.2)	16.7 (7.6)	16.7 (7.6)	20 (9.0)
Rotor Inertia	in-lb-s ² × 10 ⁻⁴ (kg-m ² × 10 ⁻⁴)	1.02 (0.12)	1.64 (0.19)	2.26 (0.26)	1.9 (0.22)	3.4 (0.38)	4.9 (0.55)	6.4 (0.72)	32 (3.6)	46 (5.2)	46 (5.2)	60 (6.8)
Shaft Thrust Load ²	lb (kg)	n/a	n/a	n/a	17 (7.7)	17 (7.7)	17 (7.7)	17 (7.7)	41.5 (18.9)	41.5 (18.9)	41.5 (18.9)	41.5 (18.9)
Shaft Radial Load ²	lb (kg)	n/a	n/a	n/a	62 (28.1)	62 (28.1)	62 (28.1)	62 (28.1)	157 (71.5)	157 (71.5)	157 (71.5)	157 (71.5)
Torque Constant	in-lb/A _(rms) (Nm/A _(rms))	2.4 (0.27)	2.9 (0.32)	2.9 (0.32)	3.3 (0.37)	4.3 (0.49)	6.5 (0.74)	7.0 (0.79)	7.7 (0.87)	11.9 (1.34)	7.5 (0.85)	10.2 (1.15)
Resistance (phase)	Ohms	16.3	6.8	3.9	8.8	4.81	6.1	4.6	3.2	3.9	1.54	1.8
Inductance (phase)	mH	7.1	4.3	2.7	10.5	7.4	10.6	8.9	8.9	13.0	5.3	7.1
Electrical Time Constant	ms	0.43	0.63	0.69	1.19	1.54	1.73	1.93	2.78	3.33	3.44	3.94
Continuous Current	A _(rms)	0.96	1.88	2.73	1.72	2.65	2.7	3.3	4.7	4.6	7.2	7.2

¹Torque shown is available up to an ambient temperature of 25°C with motor mounted to a 10' x 10' x 0.25' aluminum heat sink. For higher ambient temperature the continuous Torque must be derated by multiplying by the following factor (155-t)/130 where t=ambient motor temperature in degrees C (40°C max.).

²Shaft loads are based on L10 bearing life at 3000 rpm and assume force is applied to center of shaft.

³Peak torque ratings are limited by the specific amplifier or controller shown in the MTR-Series motor ordering information based on the amplifier's peak current limitations.

Optional Brake Data

Inertia Adder	in-lb-s ² × 10 ⁻⁴ (kg-m ² × 10 ⁻⁴)	1.1 (0.12)	1.1 (0.12)	1.1 (0.12)	1.1 (0.12)	1.1 (0.12)	1.1 (0.12)	1.1 (0.12)	9.7 (1.1)	9.7 (1.1)	9.7 (1.1)	9.7 (1.1)
Weight Adder	lb (kg)	0.4 (0.2)	0.4 (0.2)	0.4 (0.2)	0.4 (0.2)	0.4 (0.2)	0.4 (0.2)	0.4 (0.2)	1.3 (0.6)	1.3 (0.6)	1.3 (0.6)	1.3 (0.6)
Voltage	VDC ± 10%	24	24	24	24	24	24	24	24	24	24	24
Current	A	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.66	0.66	0.66	0.66
Engage Time	ms	25	25	25	25	25	25	25	20	20	20	20
Release Time	ms	25	25	25	25	25	25	25	30	30	30	30
Torque	in-lb (Nm)	10.6 (1.2)	10.6 (1.2)	10.6 (1.2)	10.6 (1.2)	10.6 (1.2)	10.6 (1.2)	10.6 (1.2)	88.5 (10)	88.5 (10)	88.5 (10)	88.5 (10)

Environmental Specifications

Relative Humidity	98% non-condensing
Ambient Temperature	-20 to 40°C operating
Storage Temperature	-30 to 150°C

Motion Solutions

Servo Motors

MTR-3T Series Servo Motors

Specifications (continued)

Specifications	Units	3T45-H	3T54-H	3T55-H	3T57-H	3T66-H	3T67-G	3T69-G
Continuous Stall Torque ¹	in-lb (Nm)	90.3 (10.2)	120 (13.5)	151 (17)	195 (22)	318 (36)	372 (42)	477 (53.9)
Continuous Torque w/ 480 V, 20A S2K	in-lb (Nm)	n/a	119.3 (13.48)	150.3 (16.98)	n/a	307 (34.69)	358.5 (40.5)	463 (52.3)
Peak Torque ³	in-lb (Nm)	181 (20.45)	304.9 (34.45)	383.9 (43.38)	488.8 (55.2)	772.5 (87.3)	902 (102)	1165 (132)
Peak Torque w/ 480V, 20A S2K	in-lb (Nm)	n/a	339 (38.3)	426 (48.1)	n/a	462 (52.2)	540 (61)	699 (78.9)
Rated Speed:								
@120 VAC input	RPM	825	n/a	n/a	n/a	n/a	n/a	n/a
@240 VAC input		1,650	2,100	1,650	2,450	1,450	1,250	950
@480 VAC input		4,000	4,300	3,400	n/a	3,150	2,700	2,100
No-load Speed:								
@120 VAC input	RPM	1,175	n/a	n/a	n/a	n/a	n/a	n/a
@240 VAC input		2,350	2,700	2,150	3,050	2,000	1,700	1,300
@480 VAC input		4,750	5,450	4,300	n/a	3,950	3,400	2,650
Feedback	4096 counts/rev resolver (control transmitter; 0.5 transformation ratio)							
Weight	lb (kg)	22.9 (10.4)	28.6 (13)	33 (15)	41.9 (19)	79.3 (36)	92.5 (42)	119 (54)
Rotor Inertia	in-lb-s ² x 10 ⁻⁴ (kg-m ² x 10 ⁻⁴)	74 (8.4)	220 (24.9)	271 (30.6)	373 (42.1)	833 (94)	965 (109)	1230 (139)
Shaft Thrust Load ²	lb (kg)	41.5 (18.9)	31.5 (18.9)	31.5 (18.9)	31.5 (18.9)	48.3 (21.9)	48.3 (21.9)	48.3 (21.9)
Shaft Radial Load ²	lb (kg)	157 (71.5)	115 (52.3)	115 (52.3)	115 (52.3)	200 (45)	200 (45)	200 (45)
Torque Constant	in-lb/A _(rms) (Nm/A _(rms))	12.9 (1.46)	11.3 (1.27)	14.2 (1.6)	10 (1.13)	15.4 (1.74)	18 (2.04)	23.3 (2.63)
Resistance (phase)	Ohms	2.1	0.8	0.9	0.3	0.32	0.35	0.41
Inductance (phase)	mH	8.7	7.1	8.8	3.1	6.5	7.7	10
Electrical Time Constant	ms	4.1	8.9	9.8	10.3	20.3	22	24.4
Continuous Current	A _(rms)	7.1	10.6	10.6	19.5	20.7	20.7	20.6

¹Torque shown is available up to an ambient temperature of 25°C with motor mounted to a 10' x 10' x 0.25' aluminum heat sink. For higher ambient temperature the continuous Torque must be derated by multiplying by the following factor (155-t)/130 where t=ambient motor temperature in degrees C (40°C max.).

²Shaft loads are based on L10 bearing life at 3000 rpm and assume force is applied to center of shaft.

³Peak torque ratings are limited by the specific amplifier or controller shown in the MTR-Series motor ordering information based on the amplifier's peak current limitations.

Optional Brake Data

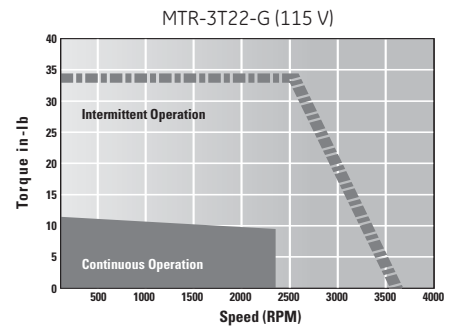
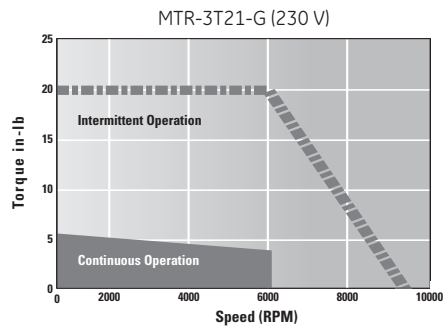
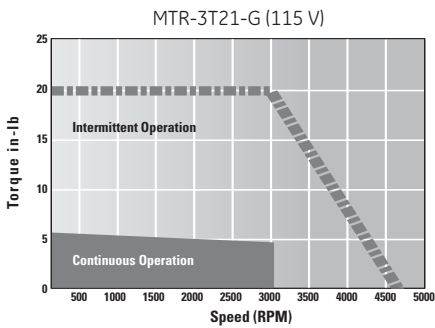
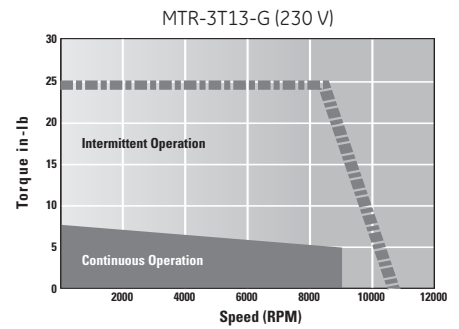
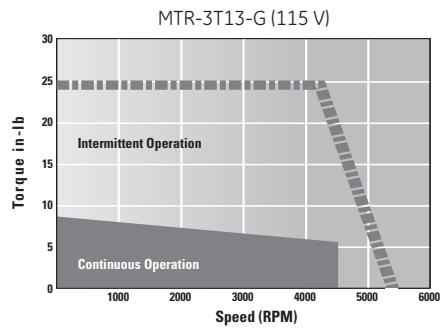
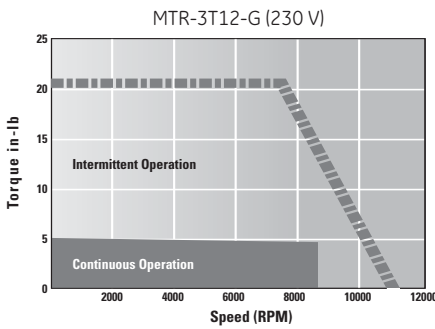
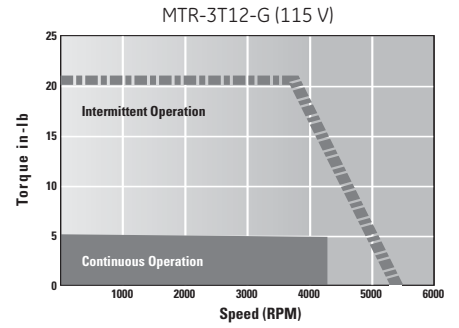
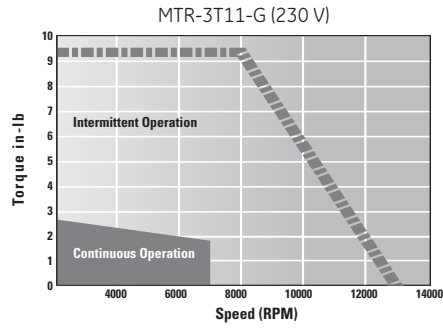
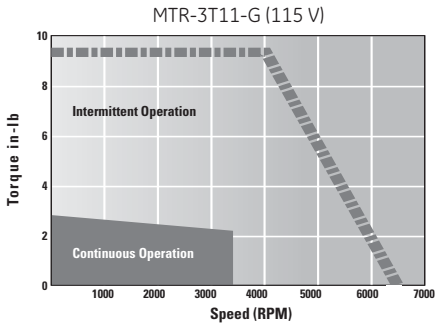
Inertia Adder	in-lb-s ² x 10 ⁻⁴ (kg-m ² x 10 ⁻⁴)	9.7 (1.1)	31.9 (3.6)	31.9 (3.6)	31.9 (3.6)	84.1 (9.5)	84.1 (9.5)	84.1 (9.5)
Weight Adder	lb (kg)	1.3 (0.6)	3.3 (1.5)	3.3 (1.5)	3.3 (1.5)	4.8 (2.2)	4.8 (2.2)	4.8 (2.2)
Voltage	VDC ± 10%	24	24	24	24	24	24	24
Current	A	0.48	0.41	0.41	0.41	0.73	0.73	0.73
Engage Time	ms	20	25	25	25	25	25	25
Release Time	ms	30	50	50	50	75	75	75
Torque	in-lb (Nm)	88.5 (10)	159 (16)	159 (16)	159 (16)	354 (40)	354 (40)	354 (40)

Environmental Specifications

Humidity	98% non-condensing
Ambient Temperature	-20 to 40°C operating
Storage Temperature	-30 to 150°C

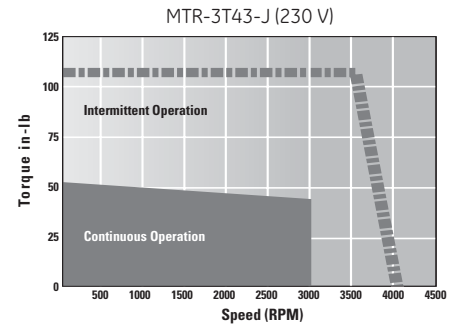
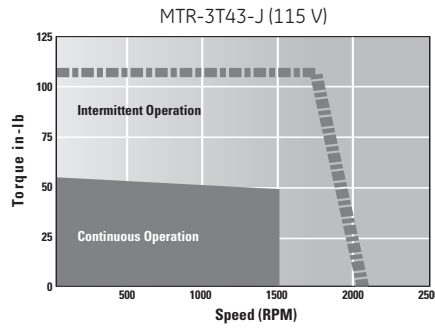
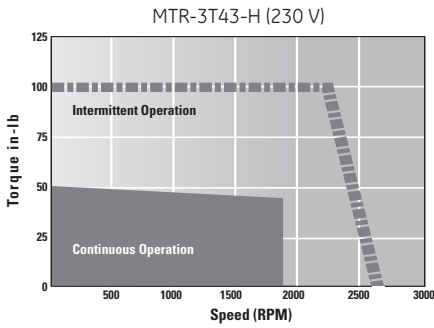
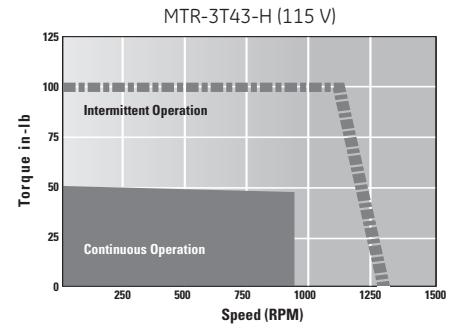
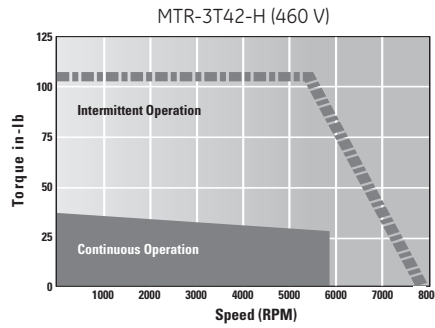
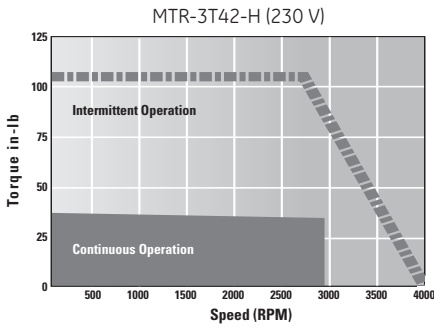
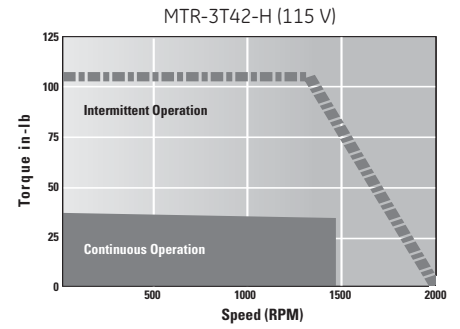
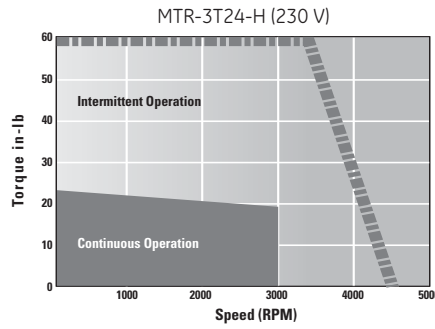
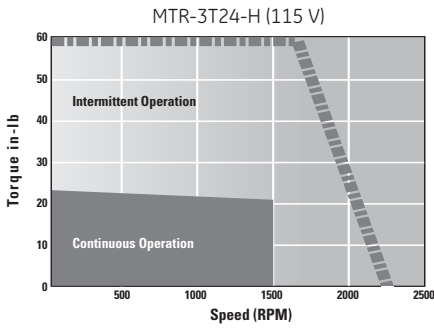
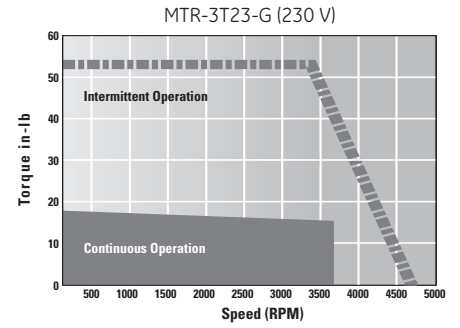
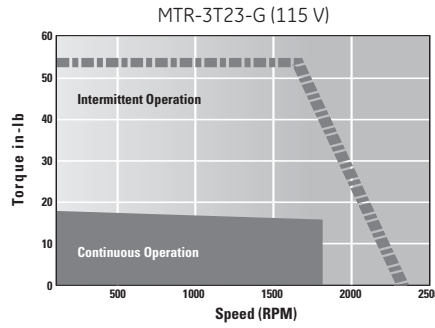
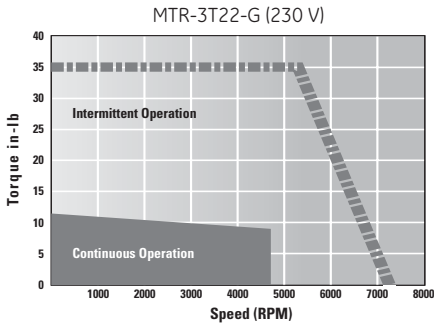
MTR-3T Series Servo Motors

Speed Torque Curves



MTR-3T Series Servo Motors

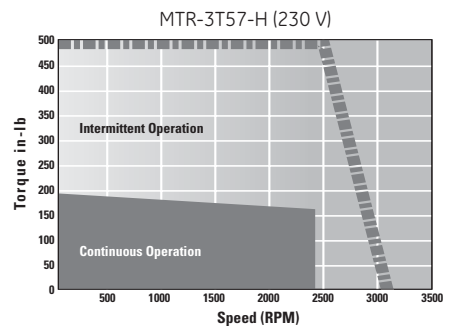
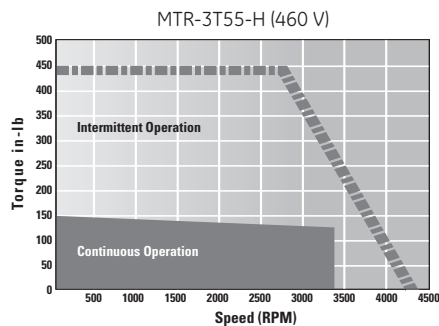
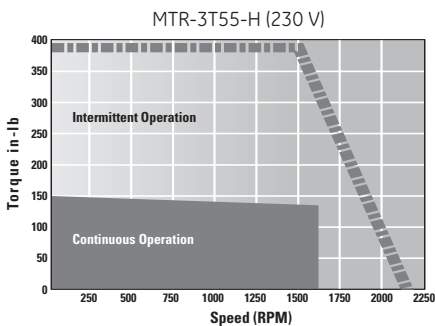
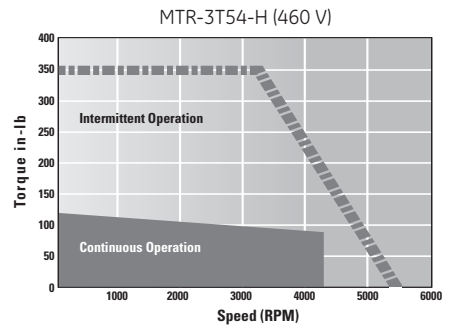
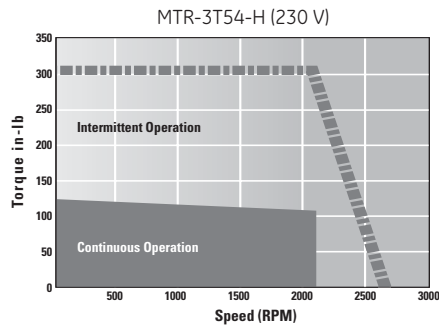
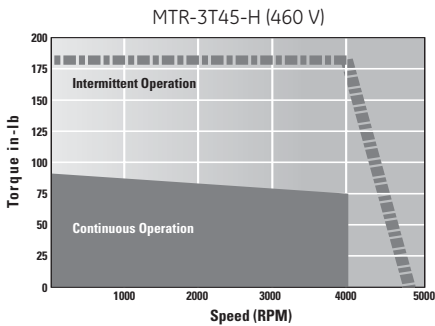
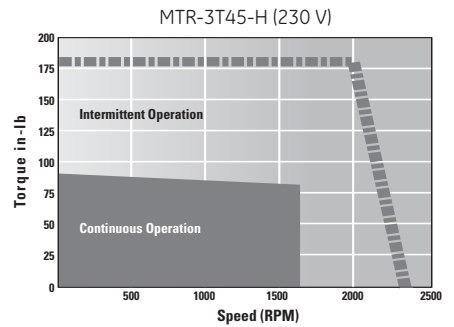
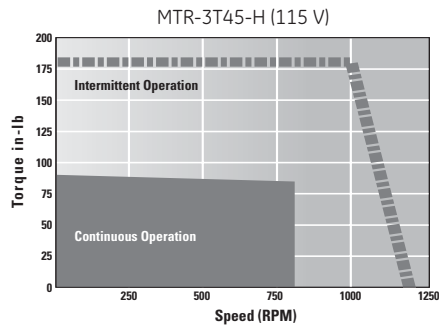
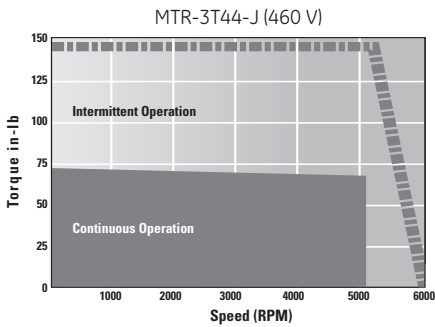
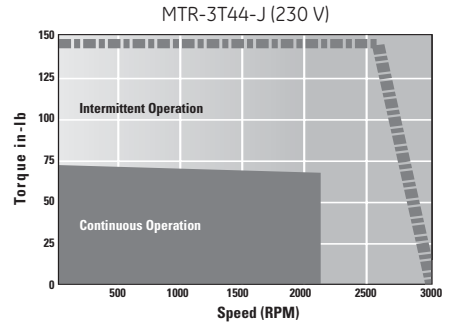
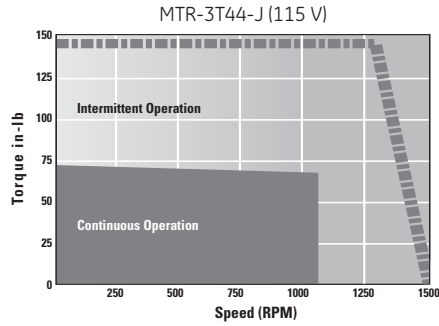
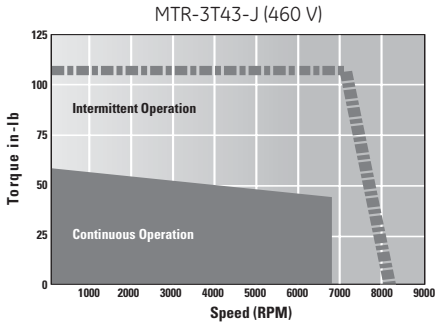
Speed Torque Curves (continued)



Servo Motors

MTR-3T Series Servo Motors

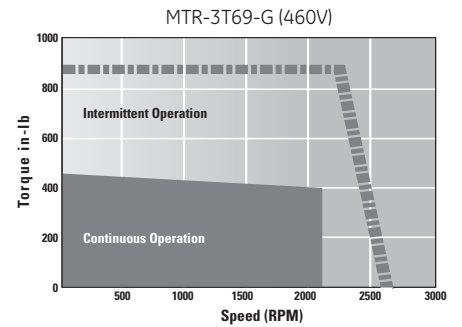
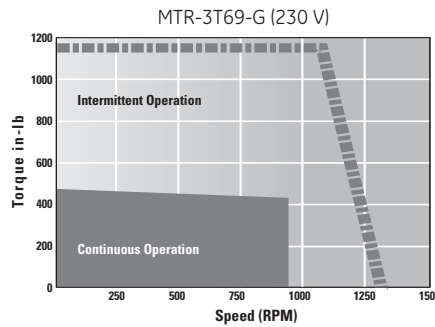
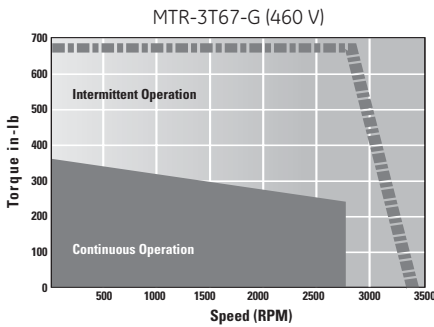
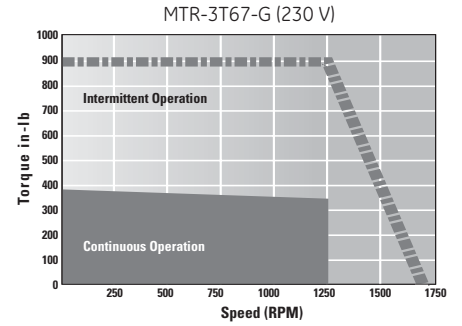
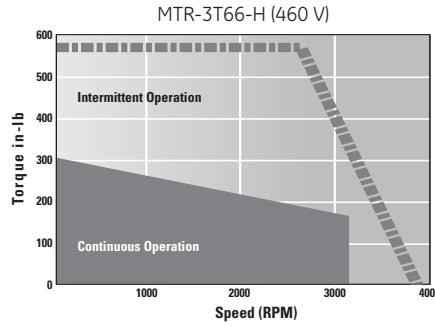
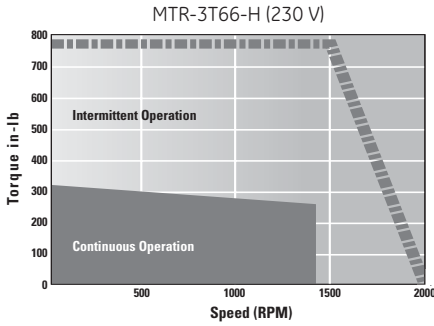
Speed Torque Curves (continued)



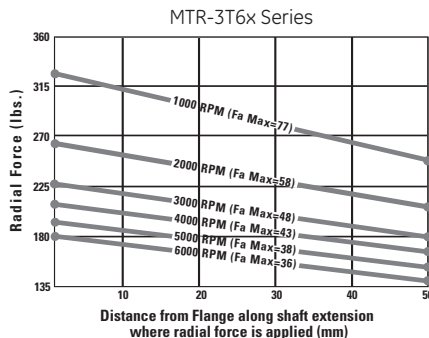
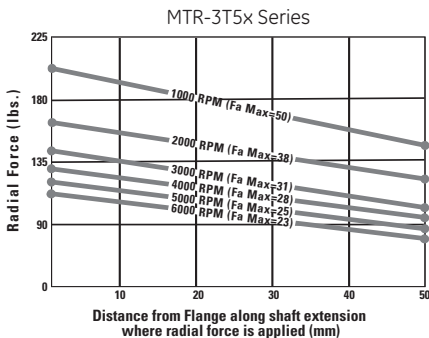
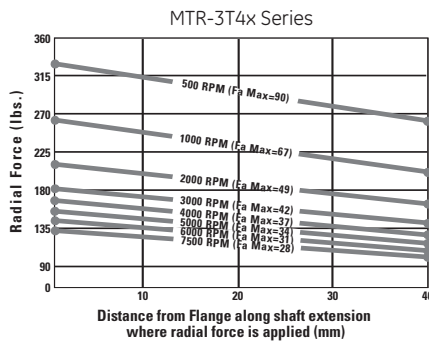
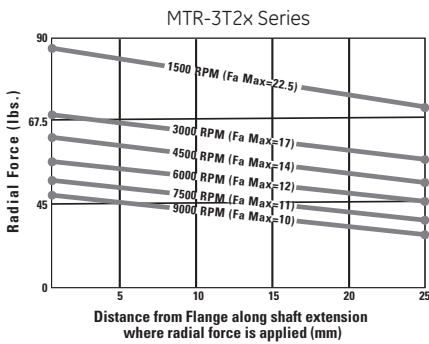
Servo Motors

MTR-3T Series Servo Motors

Speed Torque Curves (continued)



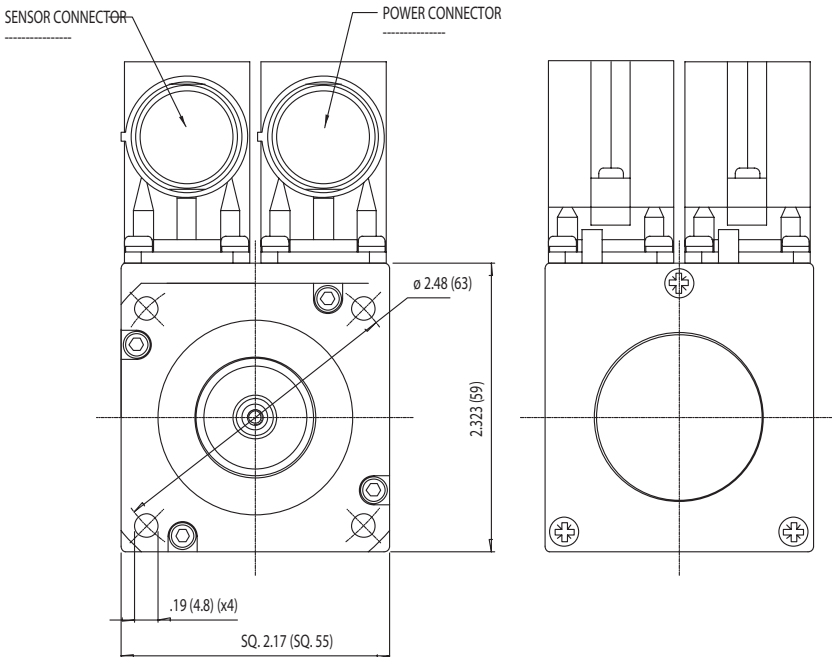
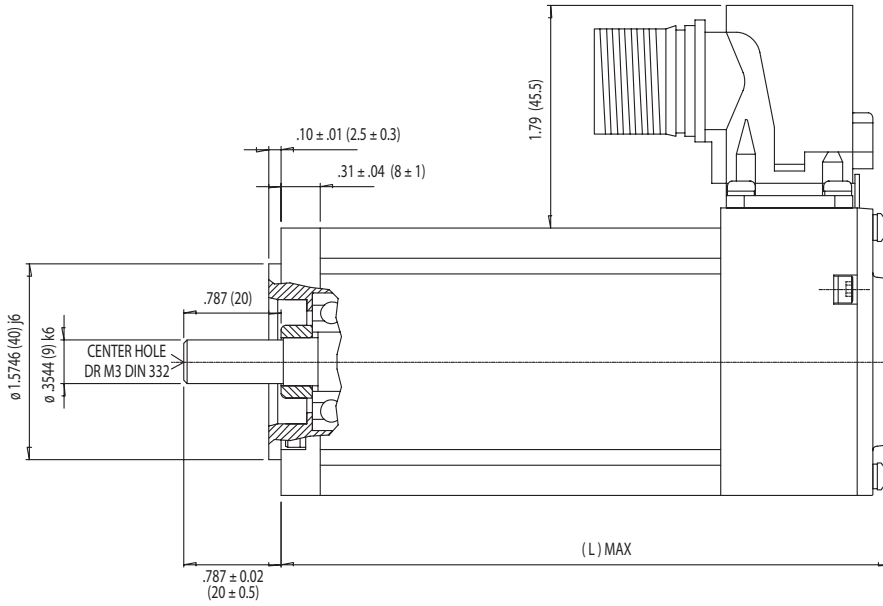
Bearing Fatigue Life (L_{10})



The L_{10} 20,000 hour rating means that 10% of the bearings will fail in 20,000 hours of operation if within the parameters specified on the curve. Median bearing life is between 4 to 5 times the L_{10} bearing fatigue life. The bearing fatigue life is an industry standard lifetime measurement and is a good indicator of motor MTBF.

MTR-3T10 Series Servo Motor

Dimensions



Model	L Max	Weight
3T11	4.921 (125)	2.6 (1.2)
3T12	5.906 (150)	3.3 (1.5)
3T13	6.890 (175)	4.2 (1.9)

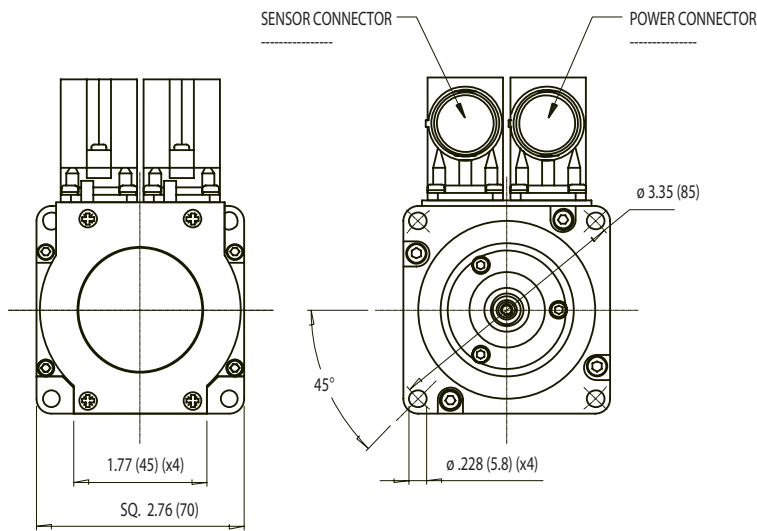
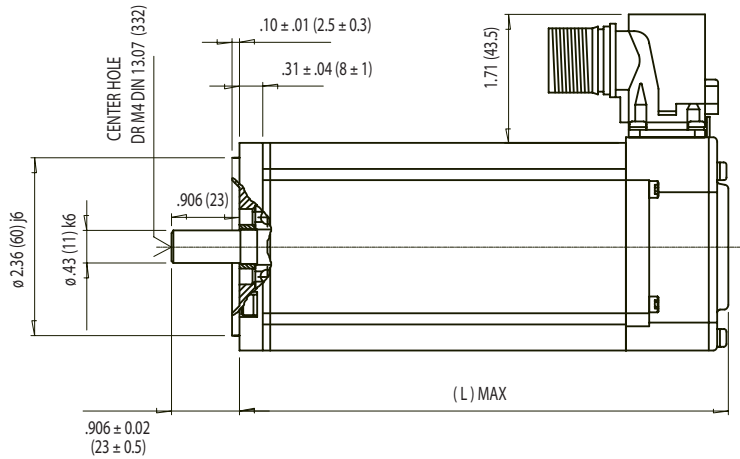
Brake Option: Add 1" (25 mm) to L; Add 0.4 lbs (0.2 kg) to Weight

Dimensions are shown in inches (mm), weight in pounds (kg)

Servo Motors

MTR-3T20 Series Servo Motor

Dimensions



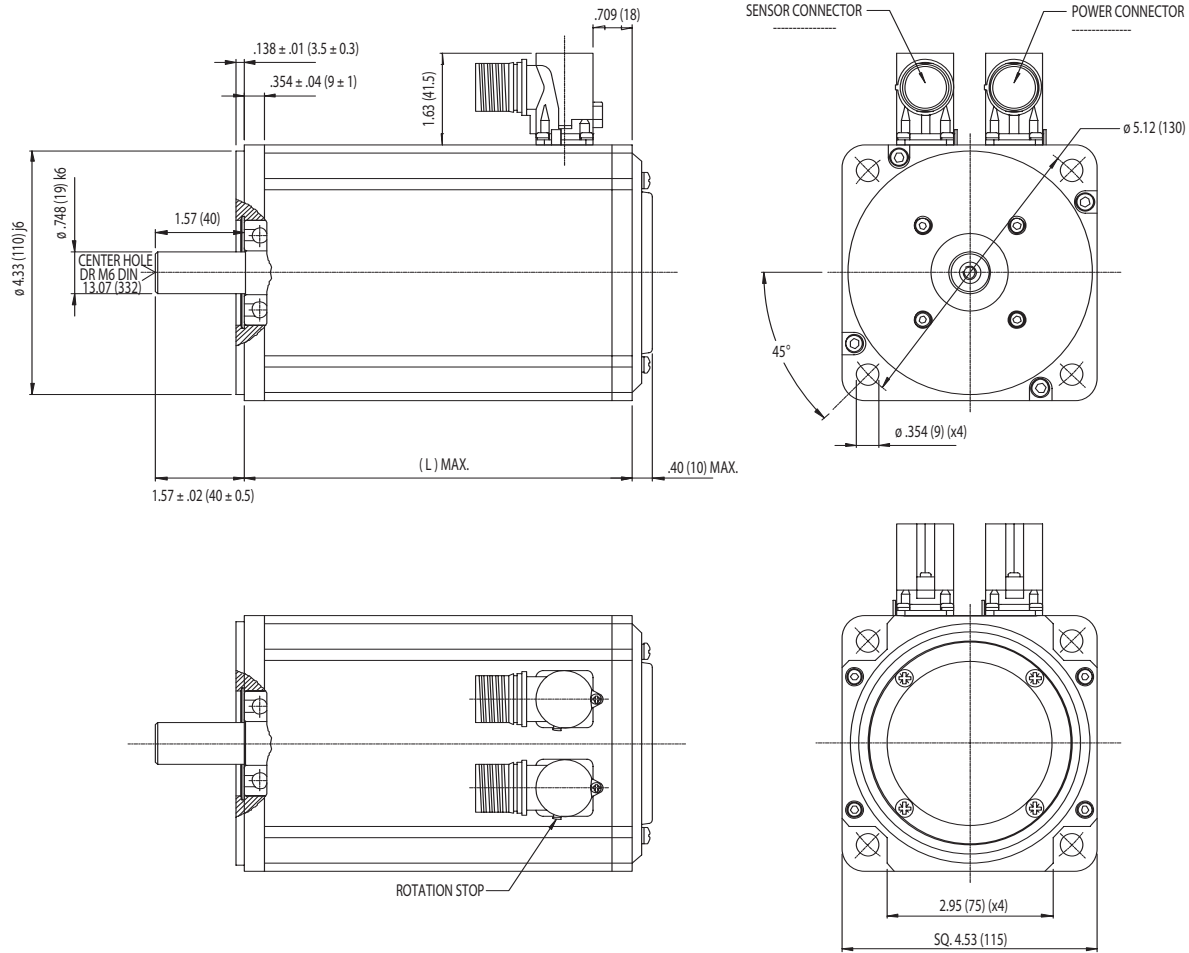
Model	L Max	Weight
3T21	5.63 (143)	3.7 (1.7)
3T22	6.61 (168)	5.0 (2.3)
3T23	7.59 (193)	6.4 (2.9)
3T24	8.58 (218)	7.7 (3.5)

Brake Option: Add 0.4 lbs (0.2 kg) to Weight

Dimensions are shown in inches (mm), weight in pounds (kg)

MTR-3T40 Series Servo Motor

Dimensions



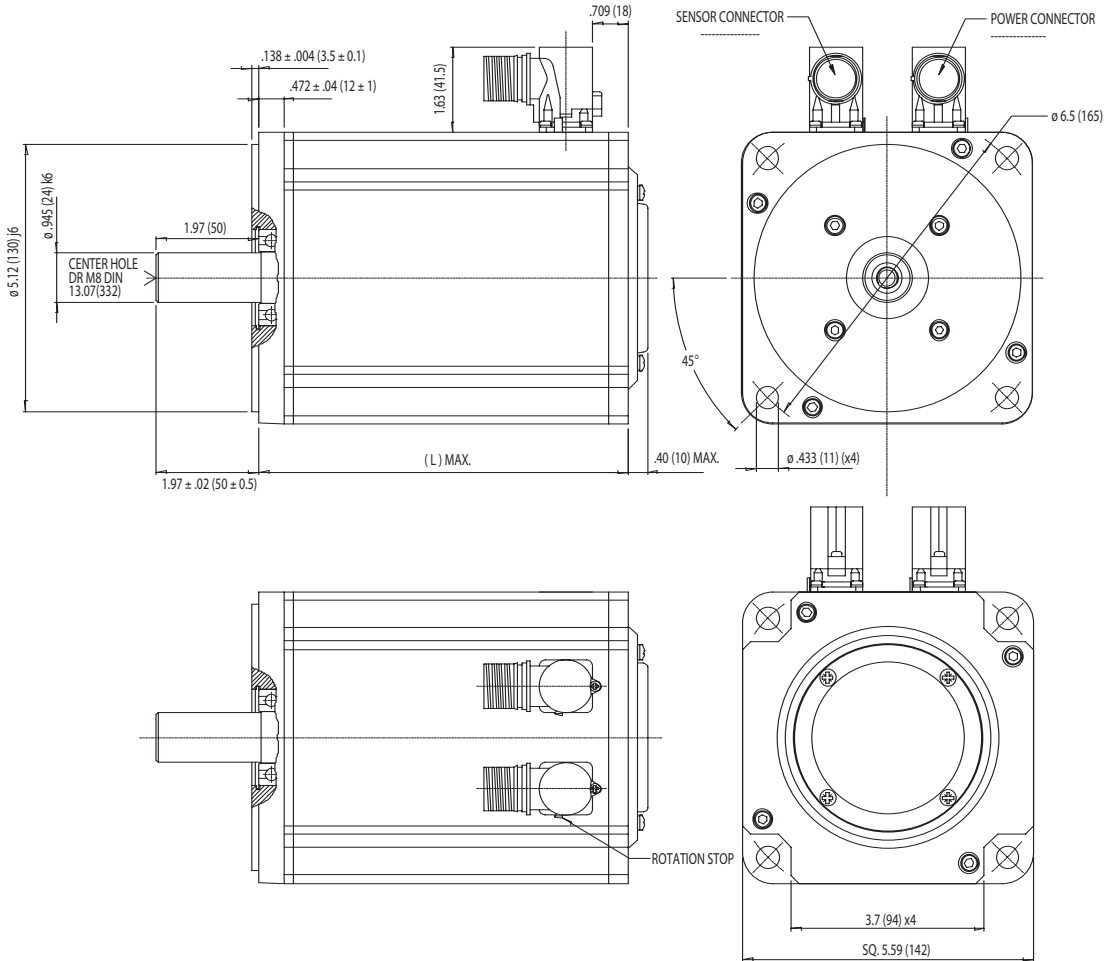
Model	L Max	Weight
3T42	7.28 (185)	13.6 (6.2)
3T43	8.27 (210)	16.7 (7.6)
3T44	9.25 (235)	20.0 (9.0)
3T45	10.24 (260)	22.9 (10.4)

Brake Option: Add 1.3 lbs (0.6 kg) to Weight
 Dimensions are shown in inches (mm), weight in pounds (kg)

Servo Motors

MTR-3T50 Series Servo Motor

Dimensions



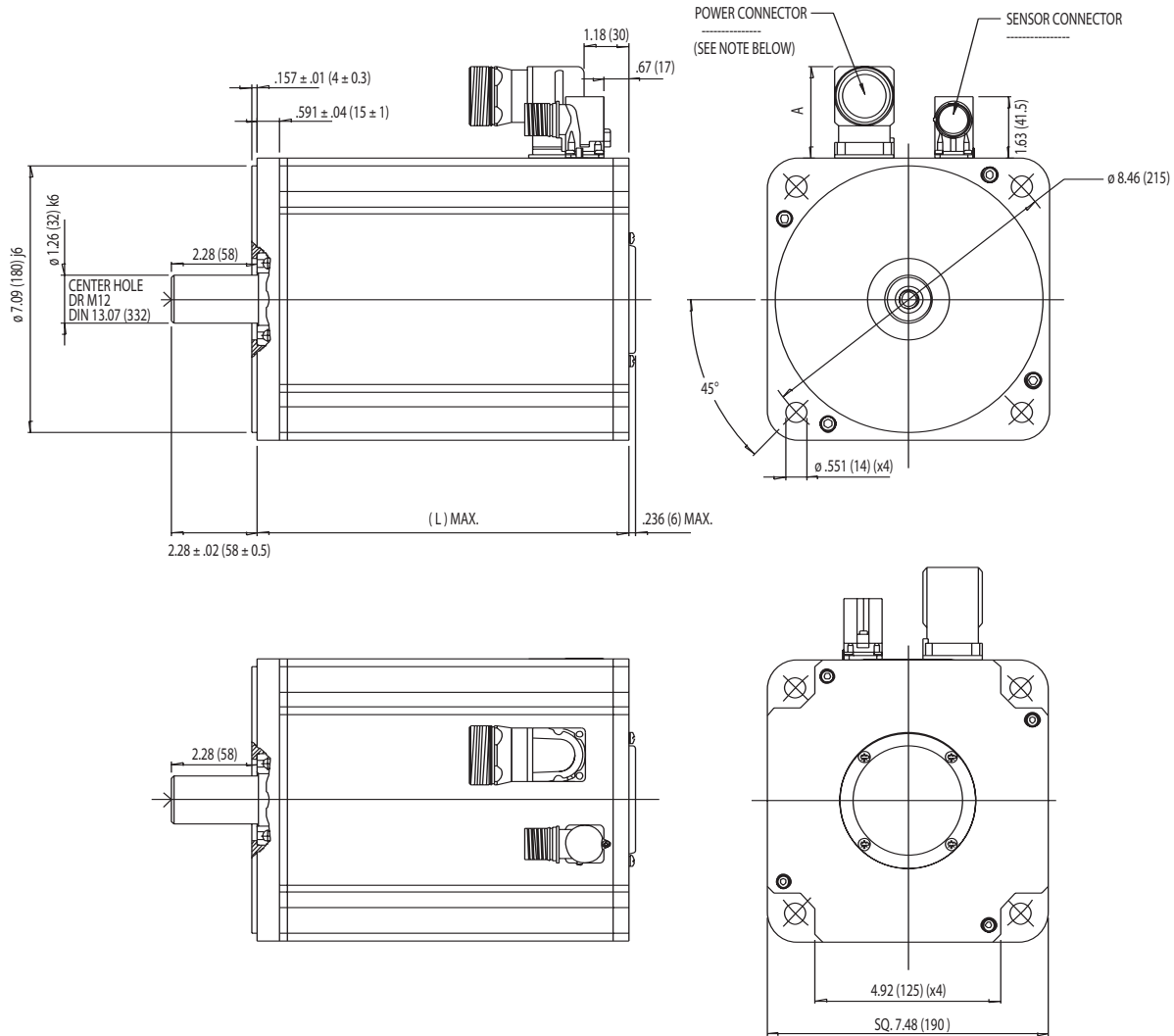
Model	L Max	Weight
3T54	9.06 (230)	28.6 (13.0)
3T55	10.04 (255)	33.0 (15.0)
3T57	12.01 (305)	41.9 (19.0)

Brake Option: Add 3.3 lbs (1.5 kg) to Weight
 Dimensions are shown in inches (mm), weight in pounds (kg)

Servo Motors

MTR-3T60 Series Servo Motor

Dimensions



Model	L Max	Weight
3T66	12.60 (320)	79.3 (36.0)
3T67	13.58 (345)	92.5 (42.0)
3T69	15.55 (395)	119 (54.0)

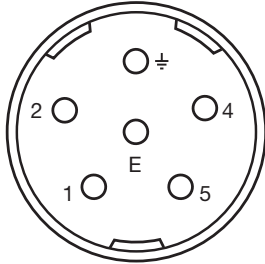
Brake Option: Add 4.8 lbs (2.2 kg) to Weight

Dimensions are shown in inches (mm), weight in pounds (kg)

Servo Motors

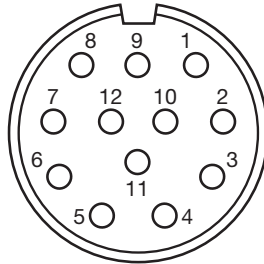
MTR-3T Series

Servo Motor Connections



Power and Brake

Pin	Function
1	Phase T
2	Phase S
⊕	Ground (Frame)
4	Optional Brake -
5	Phase R
E	Optional Brake +



Resolver

Pin	Function
1	S1 (+sine)
2	S3 (-sine)
3	S4 (-cosine)
4	S2 (+cosine)
5	R1 (Excitation)
6	R2 (Excitation RTN)
7	Thermistor
8	Thermistor

Servo Motors

MTR-Series Servo Motors

Ordering Information

Amplifier/Controller

Part Number*

Motor Only	Motor with Brake	Description	S2K Amplifier	S2K Controller
MTR-3T11-G-R-0-M-S	MTR-3T11-G-R-B-M-S	2.3 in-lb, 230V, IP65, Key, Metric, Seal	IC800SSD104RS1	IC800SSI104RS1
MTR-3T12-G-R-0-M-S	MTR-3T12-G-R-B-M-S	5.3 in-lb, 230V, IP65, Key, Metric, Seal		IC800SSI104RD2
MTR-3T13-G-R-0-M-S	MTR-3T13-G-R-B-M-S	8 in-lb, 230V, IP65, Key, Metric, Seal		IC800SSI104RP2
MTR-3T21-G-R-0-M-S	MTR-3T21-G-R-B-M-S	5.6 in-lb, 230V, IP65, Key, Metric, Seal		
MTR-3T22-G-R-0-M-S	MTR-3T22-G-R-B-M-S	11.5 in-lb, 230V, IP65, Key, Metric, Seal		
MTR-3T23-G-R-0-M-S	MTR-3T23-G-R-B-M-S	17.7 in-lb, 230V, IP65, Key, Metric, Seal		
MTR-3T24-H-R-0-M-S	MTR-3T24-H-R-B-M-S	23 in-lb, 230V, IP65, Key, Metric, Seal		
MTR-3T42-H-R-0-M-0	MTR-3T42-H-R-B-M-0	33 in-lb, 230V, IP65, Key, Metric		
MTR-3T43-H-R-0-M-0	MTR-3T43-H-R-B-M-0	54 in-lb, 230V, IP65, Key, Metric		
MTR-3T42-H-R-0-M-0	MTR-3T42-H-R-B-M-0	33 in-lb, 230V, IP65, Key, Metric	IC800SSD107RS1	IC800SSI107RS1
MTR-3T43-J-R-0-M-0	MTR-3T43-J-R-B-M-0	54 in-lb, 230V, IP65, Key, Metric		IC800SSI107RD2
MTR-3T44-J-R-0-M-0	MTR-3T44-J-R-B-M-0	72 in-lb, 230V, IP65, Key, Metric		IC800SSI107RP2
MTR-3T45-H-R-0-M-0	MTR-3T45-H-R-B-M-0	90 in-lb, 230V, IP65, Key, Metric		
MTR-3T54-H-R-0-M-0	MTR-3T54-H-R-B-M-0	120 in-lb, 230/460V, IP65, Key, Metric	IC800SSD216RS1	IC800SSI216RD2
MTR-3T55-H-R-0-M-0	MTR-3T55-H-R-B-M-0	151 in-lb, 230/460V, IP65, Key, Metric		IC800SSI216RP2
MTR-3T57-H-R-0-M-0	MTR-3T57-H-R-B-M-0	195 in-lb, 230V, IP65, Key, Metric	IC800SSD228RS1	IC800SSI228RP2
MTR-3T66-H-R-0-M-0	MTR-3T66-H-R-B-M-0	319 in-lb, 230V, IP65, Key, Metric		IC800SSI228RD2
MTR-3T67-G-R-0-M-0	MTR-3T67-G-R-B-M-0	372 in-lb, 230V, IP65, Key, Metric		
MTR-3T69-G-R-0-M-0	MTR-3T69-G-R-B-M-0	478 in-lb, 230V, IP65, Key, Metric		
MTR-3T42-H-R-0-M-0	MTR-3T42-H-R-B-M-0	33 in-lb, 230/460V, IP65, Key, Metric	IC800SSD407RS1	IC800SSI407RS1
MTR-3T43-J-R-0-M-0	MTR-3T43-J-R-B-M-0	54 in-lb, 230/460V, IP65, Key, Metric		IC800SSI407RD2
MTR-3T44-J-R-0-M-0	MTR-3T44-J-R-B-M-0	72 in-lb, 460V, IP65, Key		IC800SSI407RP2
MTR-3T45-H-R-0-M-0	MTR-3T45-H-R-B-M-0	90 in-lb, 460V, IP65, Key, Metric		
MTR-3T54-H-R-0-M-0	MTR-3T54-H-R-B-M-0	120 in-lb, 230/460V, IP65, Key, Metric	IC800SSD420RS1	IC800SSI420RD2
MTR-3T55-H-R-0-M-0	MTR-3T55-H-R-B-M-0	151 in-lb, 230/460V, IP65, Key, Metric		IC800SSI420RP2
MTR-3T67-G-R-0-M-0	MTR-3T67-G-R-B-M-0	372 in-lb, 230/460V, IP65, Key, Metric		
MTR-3T69-G-R-0-M-0	MTR-3T69-G-R-B-M-0	478 in-lb, 230/460V, IP65, Key, Metric		

*Motors can possibly be used with larger amplifiers/controllers in order to increase the system peak torque capability. Contact GE Fanuc for assistance.

Connector Mates

Motor Series	Function	Applicable Model	Part Number	Source
MTR-3T Series	Motor Power	All	21000526	GE Fanuc
	Resolver	All	21000525	GE Fanuc

Motion Solutions

Servo Motors

β i Series Servo Motors

Specifications

Motor Model	Unit	β 0.4/5000 <i>is</i>	β 0.5/5000 <i>is</i>	β 1/5000 <i>is</i>	β 2/4000 <i>is</i>	β 4/4000 <i>is</i>	β 8/3000 <i>is</i>	β 12/3000 <i>is</i>	β 22/2000 <i>is</i>
Cont Stall Torque	in-lb (Nm)	3.5 (0.4)	5.8 (0.65)	10.6 (1.2)	17.7 (2)	31 (3.5)	62 (7)	97.4 (11)	177 (20)
Peak Torque	in-lb (Nm)	8.9 (1)	22.1 (2.5)	44.3 (5)	62 (7)	88.5 (10)	132.8 (15)	239 (27)	398.3 (45)
Rotor Inertia	in-lb-s ² x 10 ⁻⁴ (kg-m ² x 10 ⁻⁴)	0.885 (0.1)	1.593 (0.18)	3.009 (0.34)	25.76 (2.91)	45.58 (5.15)	103.55 (11.7)	201.80 (22.8)	466.43 (52.7)
Rated Speed	RPM	4000	4000	4000	4000	3000	2000	2000	2000
No Load Speed	RPM	5000	5000	5000	4000	4000	3000	3000	2000

Mechanical Data

Weight	lb (kg)	1.76 (0.8)	2.2 (1)	3.3 (1.5)	6.16 (2.8)	9.46 (4.3)	16.28 (7.4)	26.18 (11.9)	37.4 (17)
Axial Load Rating	lb (kg)	11 (5)	11 (5)	11 (5)	17.6 (8)	17.6 (8)	44 (20)	44 (20)	132 (60)
Radial Load Rating	lb (kg)	44 (20)	44 (20)	44 (20)	55 (25)	55 (25)	154 (70)	154 (70)	440 (200)
Mechanical Time Constant	msec	1	0.9	0.7	4	3	3	2	2
Thermal Time Constant	min	8	10	15	15	20	20	25	30
Static Friction	Nm	0.04	0.04	0.04	0.1	0.2	0.3	0.4	0.8

Electrical Data

Torque Constant*	in-lb/A (Nm/A)	0.99 (0.11)	1.97 (0.22)	3.98 (0.45)	5.49 (0.62)	6.64 (0.75)	10.27 (1.16)	9.56 (1.08)	15.66 (1.77)
Resistance	ohms	0.55	0.85	1.5	1.6	0.94	1	0.39	0.44
Back EMF	V _{rms} /krpm	4	7.7	15.4	21	26	41	38	62
Rated Motor Power	HP (kW)	0.17 (0.13)	0.27 (0.2)	0.54 (0.4)	0.67 (0.5)	1 (0.75)	1.6 (1.2)	2.4 (1.8)	3.4 (2.5)
Cont. Stall Current	A _{rms}	3.6	2.9	2.7	3.3	4.7	6	10.2	11.3
Max Current	A _{peak}	20	20	20	20	20	20	40	40
Insulation		Class F	Class F	Class F	Class F	Class F	Class F	Class F	Class F

Amplifier Model

Amp Model Number	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-20 <i>i</i>	β SVM1-40 <i>i</i>	β SVM1-40 <i>i</i>
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Brake Data

Holding Torque	in-lb (Nm)	5.8 (0.65)	5.8 (0.65)	10.6 (1.2)	26.6 (3)	26.6 (3)	70.8 (8)	70.8 (8)	309.8 (35)
Inertia Adder	in-lb-s ² x 10 ⁻⁴ (kg-m ² x 10 ⁻⁴)	0.797 (0.09)	0.797 (0.09)	0.797 (0.09)	1.770 (0.2)	1.770 (0.2)	6.195 (0.7)	6.195 (0.7)	53.100 (6)
Weight Adder	lb (kg)	0.88 (0.4)	0.88 (0.4)	0.88 (0.4)	2.2 (1)	2.2 (1)	4.84 (2.2)	4.84 (2.2)	13.2 (6)
Current	A	0.5	0.5	0.5	0.9	0.9	1.1	1.1	1.2
Voltage	VDC	24	24	24	24	24	24	24	24
Engage time	msec	20	20	20	10	10	30	30	30
Release time	msec	40	40	40	60	60	160	160	160

Environmental Specifications

Humidity	80% non-condensing
Ambient Temperature	0 to 40°C
Vibration	less than 5G (operating)
Altitude	3300 feet (1000 m)

Data shown are nominal values at 20°C

Servo Motors

α Series Servo Motors

Specifications

An α or β Series Servo System consists of a motor and its corresponding amplifier. GE Fanuc offers several servo systems whose specifications are identified in the following table.

Motor Model	α6/3000	αC12/2000	α12/3000	α22/2000	α30/3000	α40/2000
Cont Stall Torque - in-lb [Nm]	53.1 [6]	106 [12]	106 [12]	195 [22]	266 [30]	495 [56]
Peak Torque - in-lb [Nm]	248 [28]	221 [25]	336 [38]	531 [60]	664 [75]	1062 [125]
Rotor Inertia in-lb-sec ² [kg-m ²]	2.3x10 ⁻² [2.6x10 ⁻³]	5.5x10 ⁻² [6.2x10 ⁻³]	5.5x10 ⁻² [6.2x10 ⁻³]	0.11 [1.2x10 ⁻²]	0.15 [1.7x10 ⁻²]	0.19 [2.2x10 ⁻²]
Rated Speed - rpm	3000	2000	3000	2000	3000	2000
No load speed - rpm	3000	3000	3000	2000	3000	2000

Mechanical Data

Weight - lb [kg]	28.7 [13]	39.7 [18]	40 [18]	64 [29]	90 [41]	115 [52]
Axial Load rating - lb [kg]	44 [20]	297 [135]	297 [135]	297 [135]	297 [135]	297 [135]
Radial Load rating* lb [kg]	154 [70]	992 [450]	992 [450]	992 [450]	992 [450]	992 [450]
Mechanical time constant - msec	4	5	5	4	3	3
Thermal Time Constant - min	50	60	60	65	70	30
Static Friction - in-lb [Nm]	2.7 [0.3]	7.1 [8]	7.1 [8]	10.6 [1.2]	16 [1.8]	16 [1.8]

Electrical Data

Torque Constant in-lb/A [Nm/A]	5.3 [60]	18 [2.04]	6.8 [77]	10.4 [1.17]	7.9 [89]	12 [1.4]
Resistance W	0.18	1.1	0.17	0.14	0.046	0.08
Back EMF V/krpm	21	71	27	41	31	49
Peak Motor Power - kW	8.8	5.2	11.9	12.6	23.6	18.9
Rated Motor Power - kW	1.4	1.0	2.8	3.8	4.8	5.9
Cont. Stall current A _(rms)	10	5.9	15.5	18.7	33.7	27
Peak current A _(peak)	132	46	120	160	320	270

Amplifier Model

Amp Model Number	αSVU1-80	βSVU-20	αSVU1-80	αSVU1-80	αSVU1-130	αSVU1-130
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Brake Data*

Holding Torque in-lb [Nm]	71 [8]	310 [35]	310 [35]	310 [35]	310 [35]	310 [35]
Inertia adder in-lb-sec ² [kg-m ²]	6x10 ⁻⁴ [7x10 ⁻⁴]	5.3x10 ⁻³ [6x10 ⁻³]	5.3x10 ⁻³ [6x10 ⁻³]	5.3x10 ⁻³ [6x10 ⁻³]	5.3x10 ⁻³ [6x10 ⁻³]	8.9x10 ⁻³ [1x10 ⁻²]
Weight adder - lb [kg]	5.1 [2.3]	14 [6.3]	14 [6.3]	14 [6.3]	14 [6.3]	22 [10]
Current - mA	0.4	0.6	0.6	0.6	0.6	0.6
Voltage - VDC	90 ±10%	90 ±10%	90 ±10%	90 ±10%	90 ±10%	90 ±10%
Engage time - msec	40	20	20	20	20	20
Release time - msec	80	150	150	150	150	150

*Motor brakes should not be used to stop moving loads as this will cause premature failure or reduced service life.

Servo Motors

β Series Servo Motors

Specifications

Motor Model	βM0.5/4000	βM1/4000	β0.5/3000	β2/3000	β3/3000	β6/2000
Cont Stall Torque - in-lb [Nm]	5.8 [0.65]	10.6 [1.2]	4.4 [0.5]	17 [2]	26.6 [3]	53.1 [6]
Peak Torque - in-lb [Nm]	22.1 [2.5]	44.3 [5]	16.8 [1.9]	44.3 [5]	62 [7]	133 [15]
Rotor Inertia in-lb-sec ² [kg-m ²]	1.6 × 10 ⁻⁴ [1.8 × 10 ⁻⁵]	3.0 × 10 ⁻⁴ [3.4 × 10 ⁻⁵]	1.5 × 10 ⁻⁴ [1.7 × 10 ⁻⁵]	5.8 × 10 ⁻³ [6.5 × 10 ⁻⁴]	1.7 × 10 ⁻² [1.9 × 10 ⁻³]	3.5 × 10 ⁻² [3.9 × 10 ⁻³]
Rated Speed - rpm	4000	4000	3000	3000	3000	2000
No load speed - rpm	5000	5000	4000	4000	3000	3000

Mechanical Data

Weight - lb [kg]	2.2 [1]	3.3 [1.5]	2.2 [1]	7.7 [3.2]	11 [5]	18.7 [8.5]
Axial Load rating - lb [kg]	11 [5]	11 [5]	11 [5]	18 [8]	44 [20]	44 [20]
Radial Load rating* lb [kg]	44 [20]	44 [20]	44 [20]	55 [25]	154 [70]	154 [70]
Mechanical time constant - msec	0.9	0.8	0.7	8	9	9
Thermal Time Constant - min	10	15	10	20	40	40
Static Friction - in-lb [Nm]	0.35 [0.04]	0.35 [0.04]	0.35 [0.04]	0.9 [0.1]	2.7 [0.3]	2.7 [0.3]

Electrical Data

Torque Constant - in-lb/A [Nm/A]	1.77 [0.2]	3.54 [0.4]	2.0 [0.23]	5.4 [0.61]	4.9 [0.56]	9.3 [1.05]
Resistance Ohms	0.95	1.55	0.8	1.4	0.5	0.85
Back EMF V/krpm	7.7	15.4	7.9	21.4	19.4	37.0
Rated Motor Power - kW	0.2	0.4	0.2	0.5	0.5	0.9
Cont. Stall current A(rms)	3.0	3.0	2.8	3.2	5.3	5.6
Peak current A(peak)	12.5	12.5	19	18	30	30

Amplifier Model

Amp Model Number	βSVU-20	βSVU-20	βSVU-12	βSVU-12	βSVU-20	βSVU-20
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Brake Data*

Holding Torque in-lb [Nm]	5.75 [0.65]	10.6 [1.2]	5.75 [0.65]	17.7 [2]	71 [8]	71 [8]
Inertia adder in-lb-sec ² [kg-m ²]	7.9 × 10 ⁻⁵ [9 × 10 ⁻⁶]	7.5 × 10 ⁻⁵ [9 × 10 ⁻⁶]	8 × 10 ⁻⁵ [9 × 10 ⁻⁶]	2 × 10 ⁻⁴ [2 × 10 ⁻⁵]	6 × 10 ⁻⁴ [7 × 10 ⁻⁵]	6 × 10 ⁻⁴ [7 × 10 ⁻⁵]
Weight adder - lb [kg]	0.88 [0.4]	0.88 [0.4]	.9 [0.4]	3.3 [1.5]	5.1 [2.3]	5.1 [2.3]
Current - mA	500	500	0.1	0.3	0.4	0.4
Voltage - VDC	24 ±10%	24 ±10%	90 ±10%	90 ±10%	90 ±10%	90 ±10%
Engage time - msec	20	20	20	10	40	40
Release time - msec	40	40	40	60	80	80

*Motor brakes should not be used to stop moving loads as this will cause premature failure or reduced service life.

Servo Motors

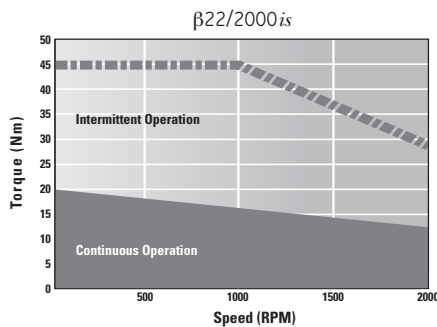
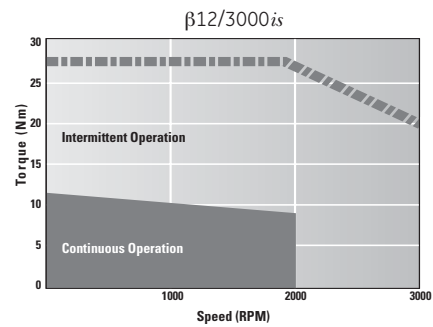
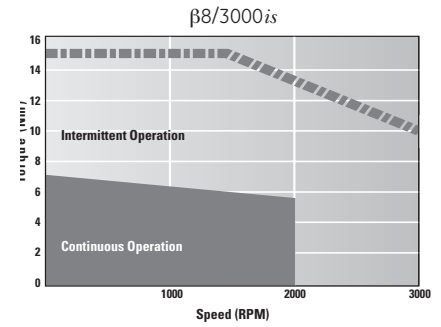
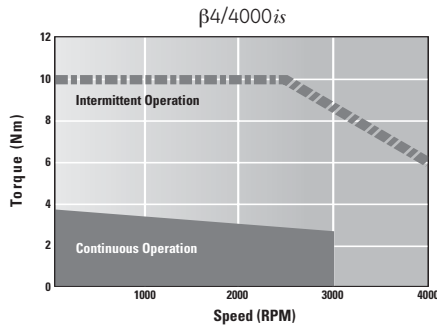
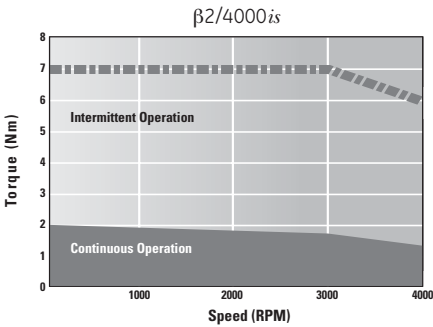
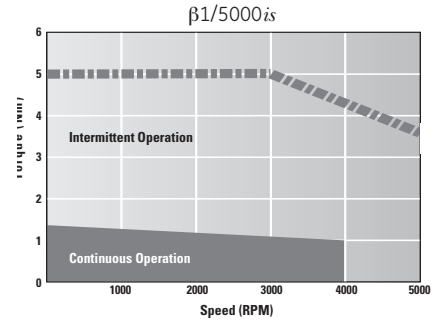
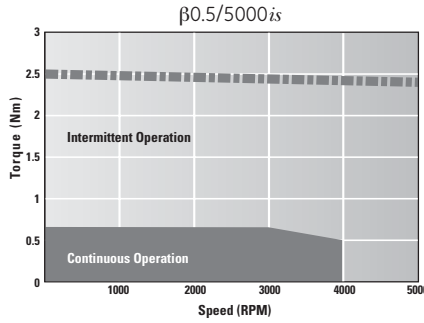
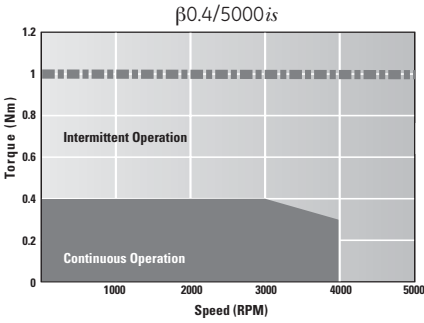
β is Series Servo Motors

Speed Torque Curves

The curves illustrate the relationship between motor speed and output torque. The motor can operate continuously at any combination of speed and torque within the prescribed continuous

operating zone. The limit of the continuous operating zone is determined with the motor's ambient temperature at 20°C and its drive current as a pure sine wave. Actual operation is limited by the current

of the servo drive unit. The continuous operating zone must be derated for ambient temperature above 20°C.



Servo Motors

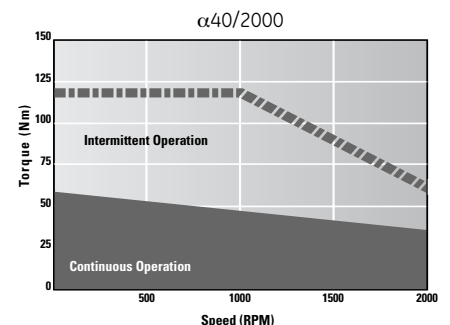
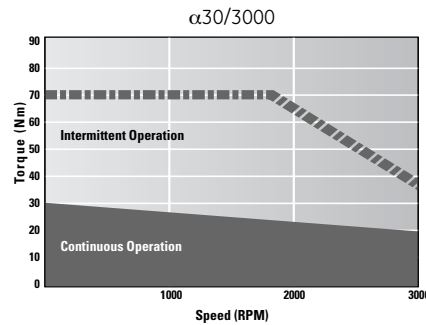
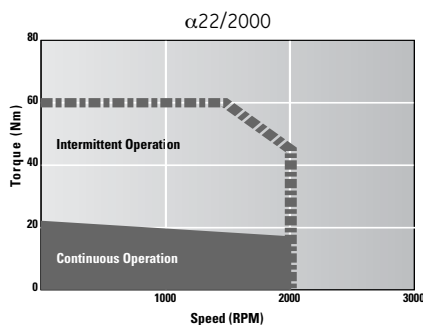
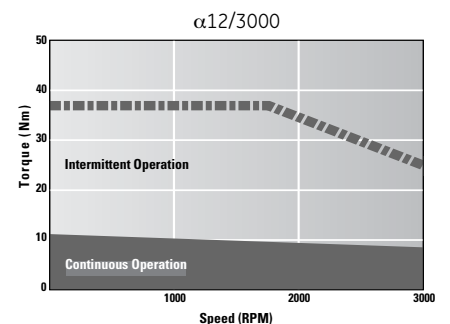
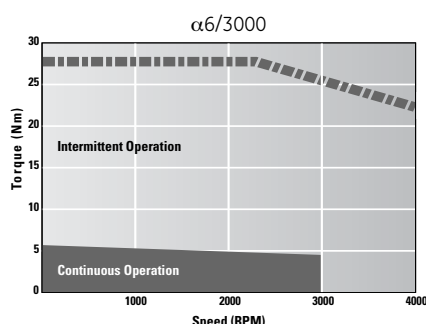
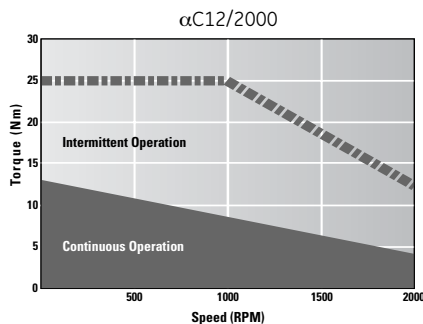
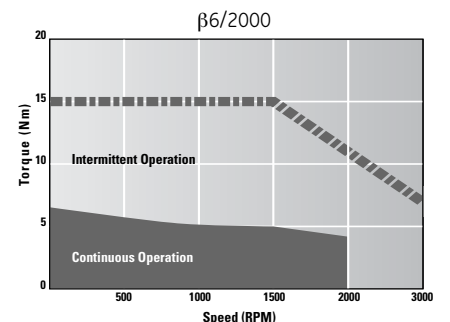
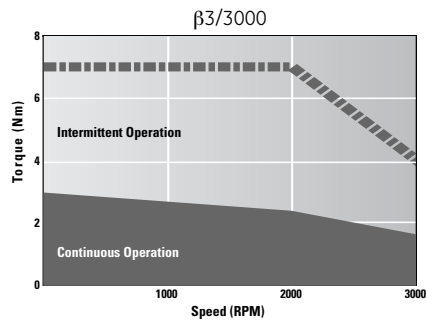
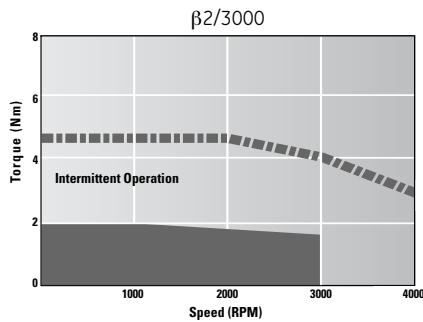
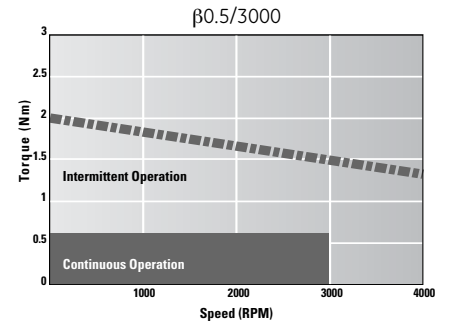
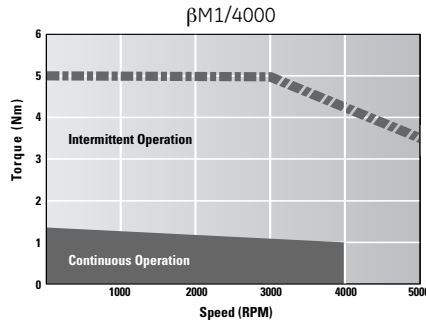
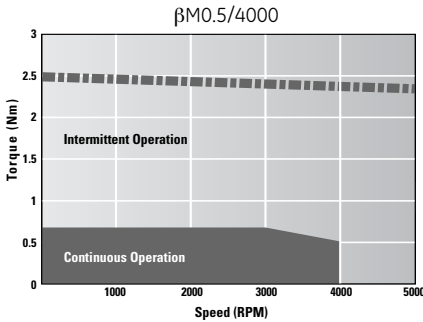
α and β Series Servo Motors

Speed Torque Curves

The curves illustrate the relationship between motor speed and output torque. The motor can operate continuously at any combination of speed and torque within the prescribed continuous

operating zone. The limit of the continuous operating zone is determined with the motor's ambient temperature at 20°C and its drive current as a pure sine wave. Actual operation is limited by the current

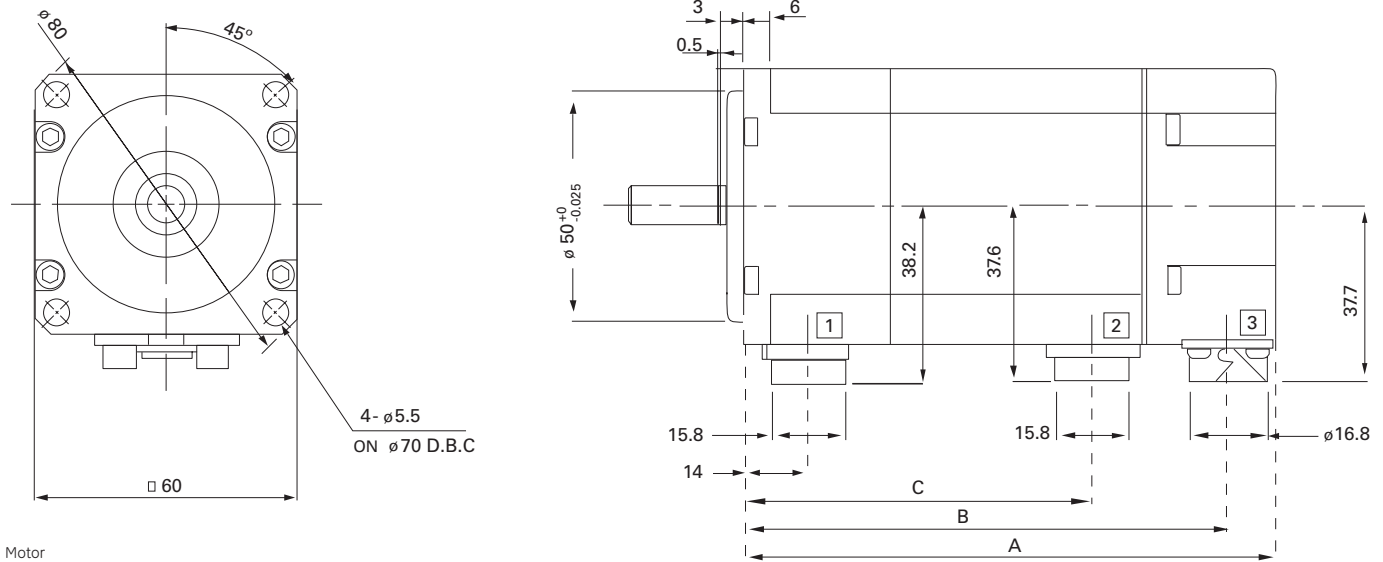
of the servo drive unit. The continuous operating zone must be derated for ambient temperature above 20°C.



βis Series Servo Motors

Dimensions

β0.4/5000is, β0.5/5000is, β1/5000is



Motor

Shaft detail

Dimensions shown mm

Dimension	β0.4/5000is	β0.5/5000is	β1/5000is
A	75	89.5	118.5
A with brake	101.5	116	145
A1	$\varnothing 9_{-0.009}^0$	$\varnothing 9_{-0.009}^0$	$\varnothing 14_{-0.011}^0$
A2	$1.2_{-0.1}^0$	$1.2_{-0.1}^0$	$2_{-0.1}^0$
A3	$3_{-0.025}^0$	$3_{-0.025}^0$	$5_{-0.33}^0$
A4	M3 Depth 6	M3 Depth 6	M4 Depth 10
A5	25	25	30
B	65	79.5	108.5
B with brake	91.5	106	135
C	34.5	49	78
C with brake	61	75.5	104.5

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

Notes

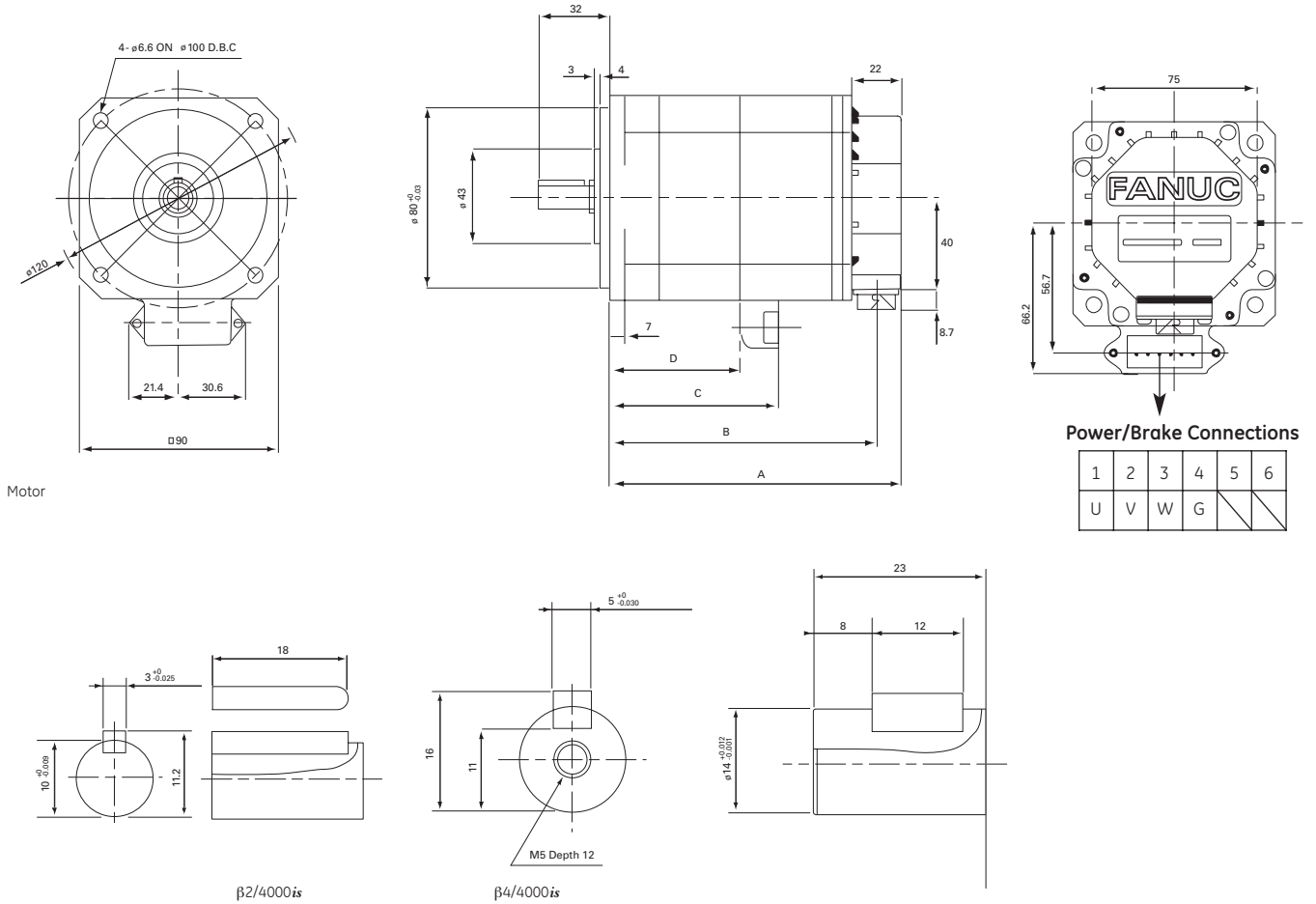
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 20 kgf (44 lb)

Servo Motors

β is Series Servo Motors

Dimensions

β 2/4000is, β 4/4000is



Motor

Shaft detail

Dimensions shown mm

Dimension	β 2/4000is	β 4/4000is
A	130	166
A with brake	159	195
B	119	155
B with brake	148	184
C	75	111
C with brake	75	111
D	59	95
D with brake	59	95

Notes

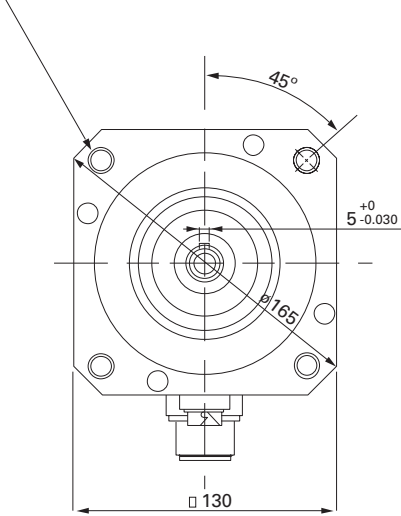
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 25 kgf (55 lb)

βis Series Servo Motors

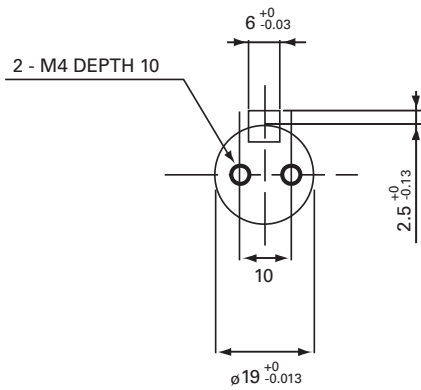
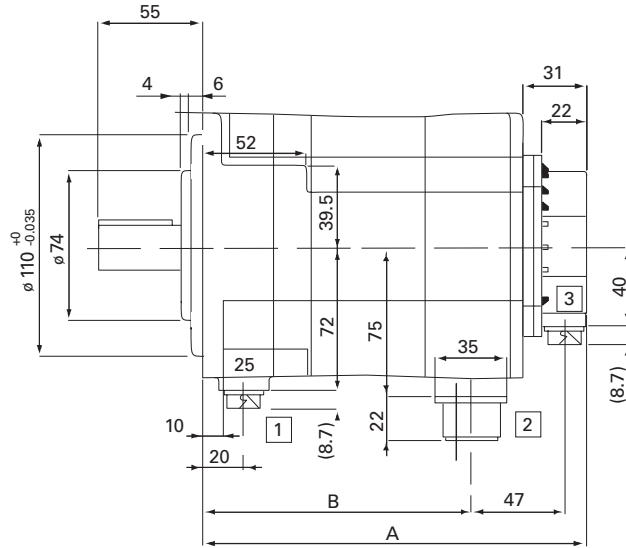
Dimensions

β8/3000is, β12/3000is

4-ø9 ON ø145 D.B.C.

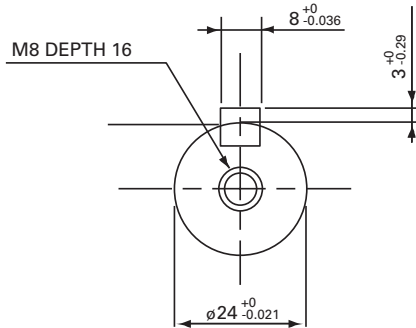


Motor

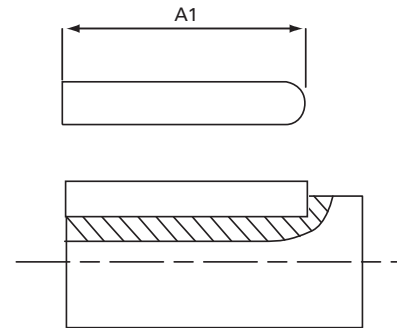


Shaft detail

β8/3000is



β12/3000is



Dimensions shown mm

Dimension	β8/3000is	β12/3000is
A	166	222
A with brake	191	247
A1	36	45
B	108	164
B with brake	133	189

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

Notes

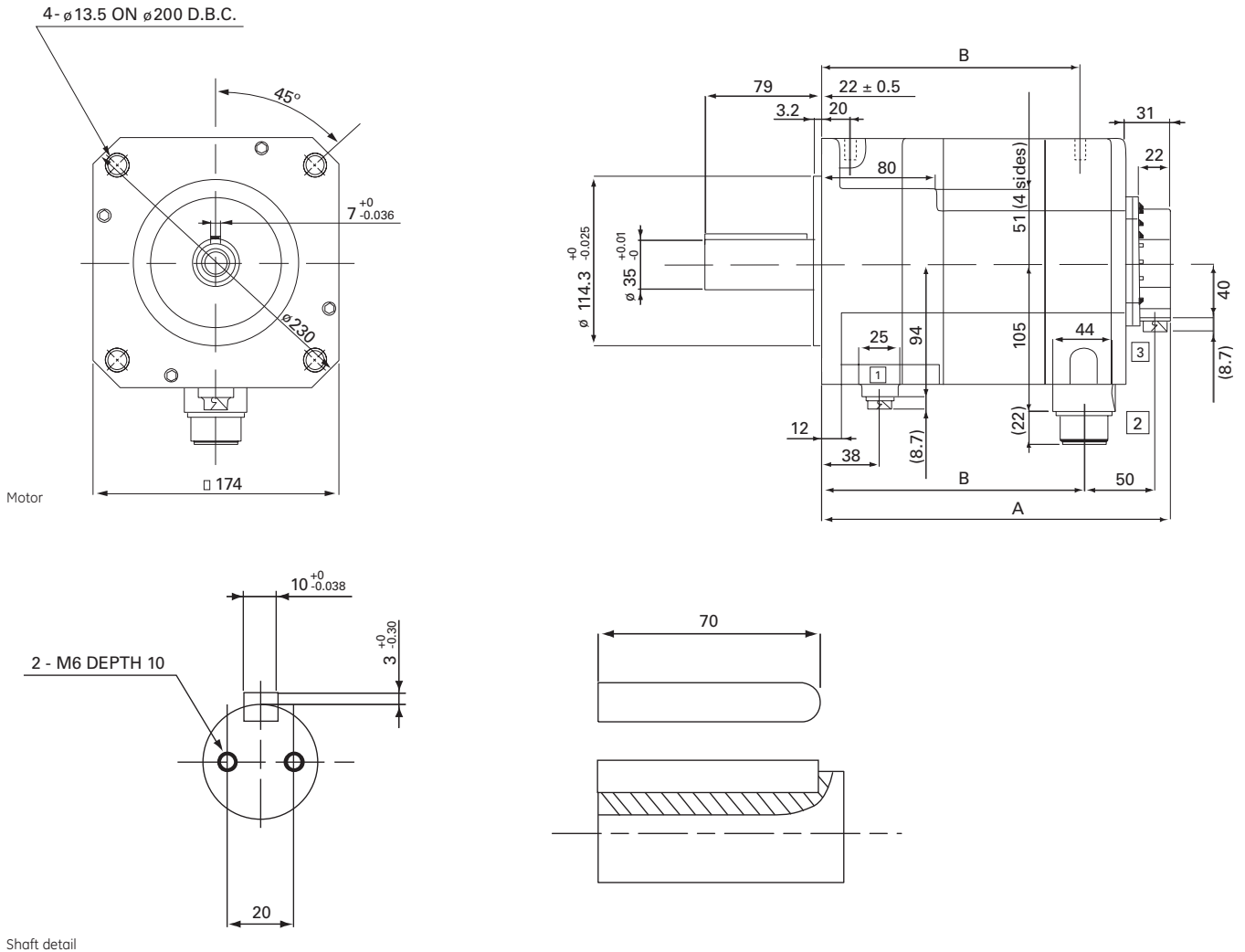
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.05 mm max
3. Maximum radial load for output shaft is 70 kgf (154 lb)

Servo Motors

βis Servo Series Motors

Dimensions

β22/2000is



Dimensions shown mm

Dimension	β22/2000is
A	202
A with brake	243
B	141
B with brake	182

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

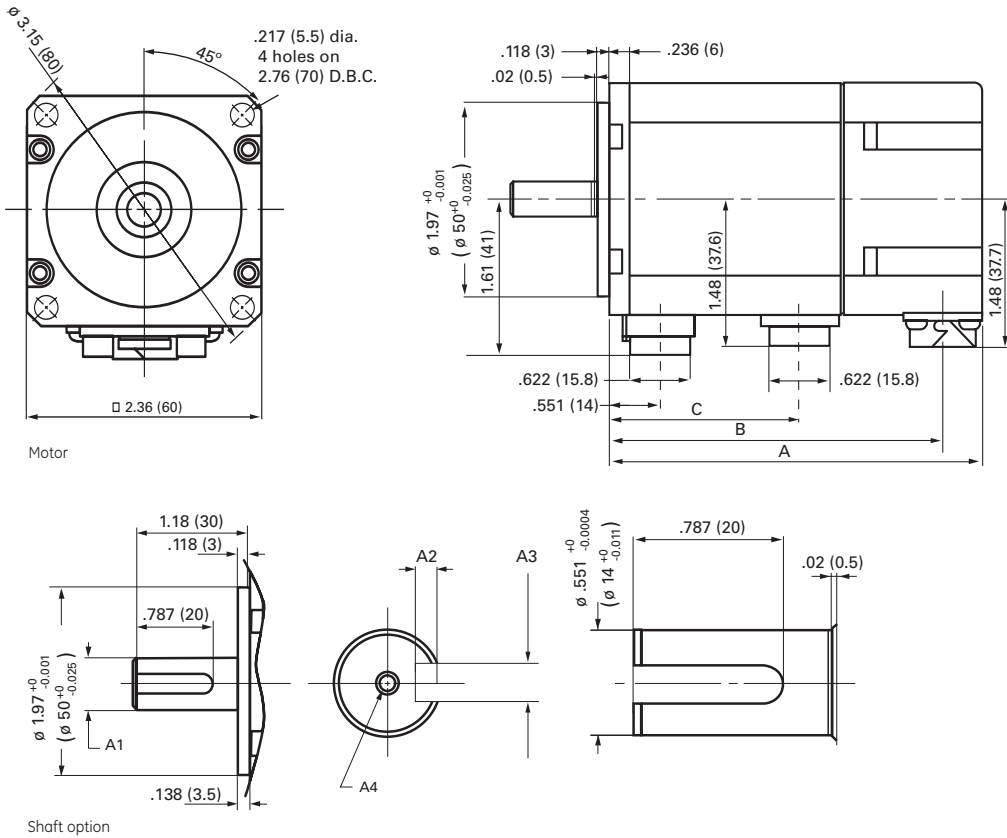
Notes

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 200 kgf (440 lb)

β Series Servo Motors

Dimensions

βM0.5/4000, βM1/4000



Dimensions shown in mm (in)

Dimension	βM0.5/4000	βM1/4000
A	95.5 (3.76)	124.5 (4.90)
A with brake	122 (4.80)	151 (5.94)
A1	∅9 ⁰ _{-0.009} (0.3543/0.3539)	∅14 ⁰ _{-0.011} (0.5512/0.5507)
A2	1.8 ^{+0.1} ₀ (0.0748/0.0709)	3 ^{+0.1} ₀ (0.1220/0.1181)
A3	3 ^{+0.004} _{-0.029} (0.1179/0.1169)	5 ^{+0.030} _{-0.030} (0.1968/0.1956)
A4	M3 Depth 6	M4 Depth 10
B	85.5 (3.67)	114.5 (4.51)
B with brake	112 (4.41)	141 (5.55)
C	49 (1.93)	78 (3.07)
C with brake	75.5 (2.97)	104.5 (4.11)

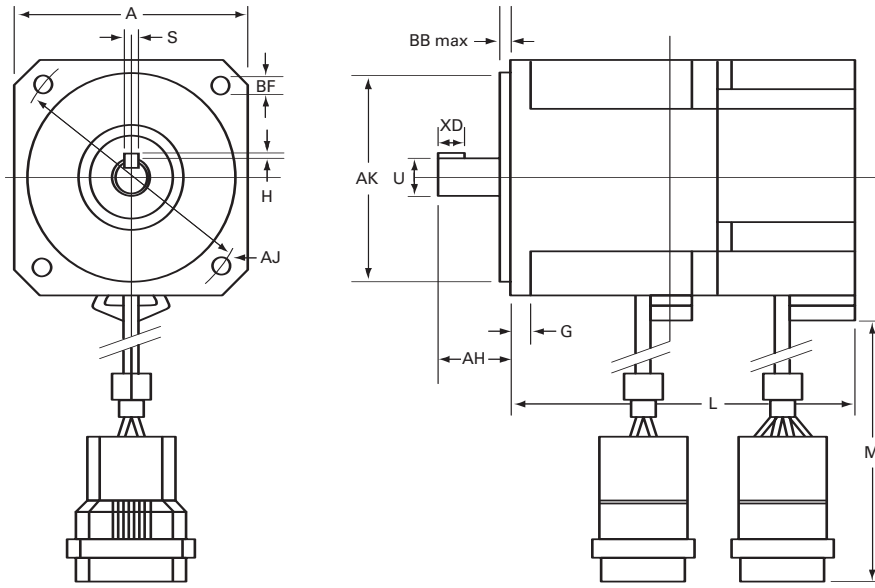
Notes

1. Shaft diameter runout = 0.02 mm max for βM0.5/4000, βM1/4000
2. Flange surface runout = 0.06 mm max for βM0.5/4000, βM1/4000
3. Maximum radial load for output shaft is 20 kgf (44 lb) for βM0.5/4000, βM1/4000

β Series Servo Motors

Dimensions

β0.5/3000 Motors



Dimensions shown in mm (in)

Dimension	β0.5/3000
A	60 (2.36)
AH	25 (0.984)
AH with brake	25 (0.984)
AJ (dia.)	70 (2.76)
AK	50 ⁺⁰ _{-0.025} (1.9685/1.9675)
AK with brake	50 ⁺⁰ _{-0.025} (1.9685/1.9675)
BB	3 (0.118)
BB with brake	3 (0.118)
BF (dia.)	5.5 (0.2165)
G	6 (0.236)
G with brake	6 (0.236)
H	1.2 ⁺⁰ _{-0.125} (0.0472/0.0423)
L	100 (3.94)
L with brake	128 (5.04)
M	~ 300 (11.81)
M with brake	~ 300 (11.81)
S	3 ⁺⁰ _{-0.025} (0.1181/0.1191)
U	9 ⁺⁰ _{-0.009} (0.3543/0.3539)
U with brake	9 ⁺⁰ _{-0.009} (0.3543/0.3539)
XD	20 (0.787)
XD with brake	20 (0.787)

Notes

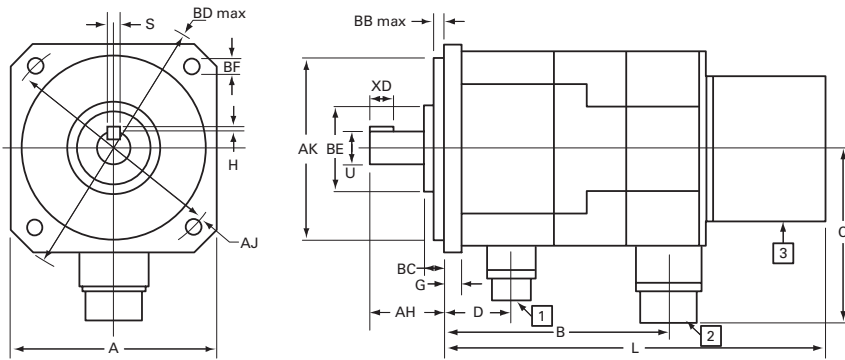
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 20 kgf (44 lb)

Servo Motors

β Series Servo Motors

Dimensions

β2/3000, β3/3000, β6/2000 and αC12/2000 Motors



Dimensions shown in mm (in)

Dimension	β2/3000	β3/3000	β6/2000	αC12/2000
A	105 (4.13)	142 (5.59)	142 (5.59)	174 (6.85)
AH	36 (1.42)	46 (1.81)	46 (1.81)	79 (3.11)
AH with brake	36 (1.42)	46 (1.81)	46 (1.81)	79 (3.11)
AJ (dia.)	115 (4.53)	165 (6.50)	165 (6.50)	200 (7.87)
AK	95 ⁺⁰ _{-0.035} (3.7401/3.7388)	130 ⁺⁰ _{-0.035} (5.1181/5.1167)	130 ⁺⁰ _{-0.035} (5.1181/5.1167)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
AK with brake	95 ⁺⁰ _{-0.035} (3.7401/3.7388)	130 ⁺⁰ _{-0.035} (5.1181/5.1167)	130 ⁺⁰ _{-0.035} (5.1181/5.1167)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
B	93 (3.66)	79 (3.11)	117 (4.61)	166 (6.54)
B with brake	149 (5.87)	131 (5.16)	169 (6.65)	238 (9.37)
BB	5 (0.196)	5 (0.196)	5 (0.196)	3.2 (0.126)
BB with brake	5 (0.196)	5 (0.196)	5 (0.196)	3.2 (0.126)
BC	12 (0.472)	n/a	n/a	n/a
BC with brake	12 (0.472)	n/a	n/a	n/a
BD	134 (5.38)	190 (7.48)	190 (7.48)	240 (9.45)
BE	43 (1.69)	90 (3.54)	90 (3.54)	n/a
BF (dia.)	9 (0.354)	11 (0.433)	11 (0.433)	13.5 (0.532)
C	88 (3.46)	110 (4.33)	110 (4.33)	122 (4.80)
C with brake	88 (3.46)	110 (4.33)	110 (4.33)	122 (4.80)
D with brake	31 (1.22)	28 (1.10)	28 (1.10)	65 (2.56)
G	8 (0.315)	10 (0.394)	10 (0.394)	18 (0.709)
G with brake	8 (0.315)	10 (0.394)	10 (0.394)	18 (0.709)
H	2 ⁺⁰ _{-0.13} (0.0787/0.0736)	2.5 ⁺⁰ _{-0.13} (0.0984/0.0933)	2.5 ⁺⁰ _{-0.13} (0.0984/0.0933)	3 ⁺⁰ _{-0.29} (0.118/0.107)
L	174 (6.85)	165 (6.49)	203 (7.99)	240 (9.45)
L with brake	230 (9.06)	217 (8.54)	255 (10.04)	312 (12.28)
S	5 ⁺⁰ _{-0.03} (0.1969/0.1957)	6 ⁺⁰ _{-0.03} (0.236/0.235)	6 ⁺⁰ _{-0.03} (0.236/0.235)	10 ⁺⁰ _{-0.036} (0.394/0.392)
U	14 ⁺⁰ _{-0.011} (0.5512/0.5507)	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	35 ^{+0.01} ₋₀ (1.3783/1.3780)
U with brake	14 ⁺⁰ _{-0.011} (0.5512/0.5507)	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	35 ^{+0.01} ₋₀ (1.3783/1.3780)
XD	20 (0.787)	28 (1.10)	28 (1.10)	70 (2.76)
XD with brake	20 (0.787)	28 (1.10)	28 (1.10)	70 (2.76)

Connector	Description
1	Brake (optional)
2	Power
3	Encoder Feedback

Notes

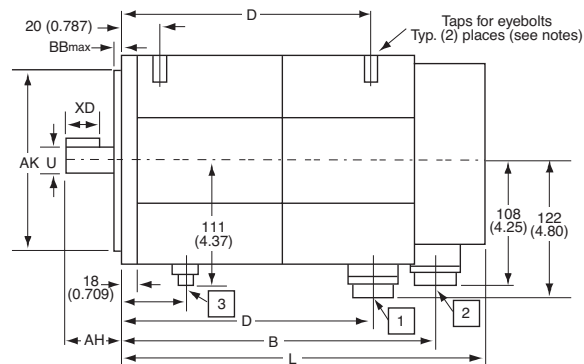
1. Shaft diameter runout = 0.02 mm max for β2/3000, β3/3000 and β6/2000; 0.05 mm for αC12/2000
2. Flange surface runout = 0.06 mm max for β2/3000, β3/3000 and β6/2000; 0.10 mm for αC12/2000
3. Maximum radial load for output shaft is 25 kgf (55 lb) for β2/3000; 70 kgf (154 lb) for β3/3000 and β6/2000; 450 kgf (990 lb) for αC12/2000

Servo Motors

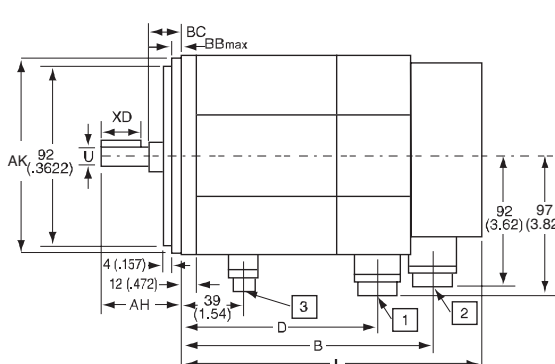
α Series Servo Motors

Dimensions

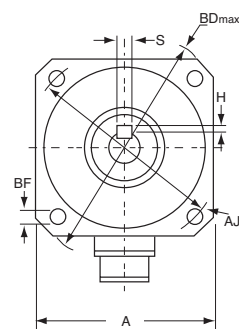
α6/3000, α12/3000, α22/2000 and α30/3000 Motors



α12/3000, α22/2000 and α30/3000 with brake, side view



α6/3000 with brake, side view



Connector	Description
1	Motor AC Power Connector
2	Motor Encoder Feedback Connector
3	Brake Connector

Dimensions shown in mm (in)

Dimension	α6/3000	α12/3000	α22/2000	α30/3000
A	130 (5.118)	174 (6.85)	174 (6.85)	174 (6.85)
AJ (dia.)	145 (5.709)	200 (7.874)	200 (7.874)	200 (7.874)
AH	55 (2.165)	79 (3.11)	79 (3.11)	79 (3.11)
AH with brake	55 (2.165)	79 (3.11)	79 (3.11)	79 (3.11)
AK	110 ⁺⁰ _{-0.035} (4.331/4.329)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
AK with brake	110 ⁺⁰ _{-0.035} (4.331/4.329)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
B	221 (8.70)	215 (8.465)	289 (11.378)	363 (14.291)
B with brake	270 (10.63)	287 (11.30)	361 (14.21)	435 (17.13)
BB	6 (0.236)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)
BB with brake	6 (0.236)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)
BC	15±0.5 (0.610/0.571)	n/a	n/a	n/a
BC with brake	221 (8.70)	n/a	n/a	n/a
BD	165 (6.496)	n/a	n/a	n/a
BF (dia.)	9 (0.354)	13.5 (0.532)	13.5 (0.532)	13.5 (0.532)
D	176 (6.93)	166 (6.535)	240 (9.449)	314 (12.362)
D with brake	225 (8.858)	238 (9.37)	312 (12.28)	386 (15.20)
H	2.5 ⁺⁰ _{-0.013} (0.0984/0.0933)	3 ⁺⁰ _{-0.30} (0.1181/0.1063)	3 ⁺⁰ _{-0.30} (0.1181/0.1063)	3 ⁺⁰ _{-0.30} (0.1181/0.1063)
L	259 (10.20)	240 (9.45)	314 (12.36)	388 (15.28)
L with brake	309 (12.17)	312 (12.28)	386 (15.20)	460 (18.11)
S	6 ⁺⁰ _{-0.030} (0.2362/0.235)	10 ⁺⁰ _{-0.036} (0.3937/0.3923)	10 ⁺⁰ _{-0.036} (0.3937/0.3923)	10 ⁺⁰ _{-0.036} (0.3937/0.3923)
U	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	35 ^{+0.01} ₋₀ (1.3784/1.3779)	35 ^{+0.01} ₋₀ (1.3784/1.3779)	35 ^{+0.01} ₋₀ (1.3784/1.3779)
U with brake	19 ⁺⁰ _{-0.013} (0.7480/0.7475)	35 ^{+0.01} ₋₀ (1.3784/1.3779)	35 ^{+0.01} ₋₀ (1.3784/1.3779)	35 ^{+0.01} ₋₀ (1.3784/1.3779)
XD	36 (1.417)	70 (2.756)	70 (2.756)	70 (2.756)
XD with brake	36 (1.417)	70 (2.756)	70 (2.756)	70 (2.756)

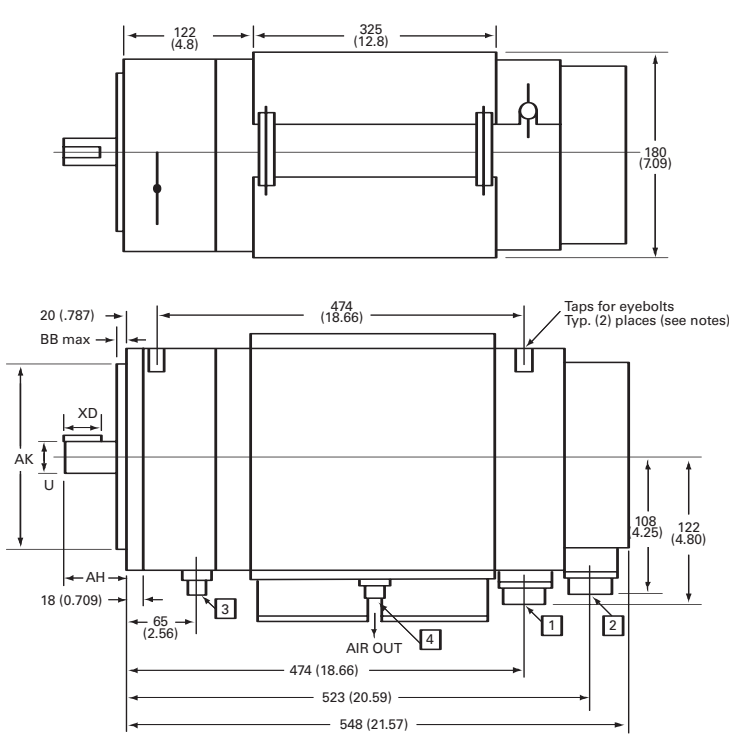
Notes

- Shaft diameter runout = 0.02 mm max for α6/3000; 0.05 mm max for α12/3000, α22/2000 and α30/3000
- Flange surface runout = 0.06 mm max for α6/3000; 0.10 mm max for α12/3000, α22/2000 and α30/3000
- Rabbit diameter eccentricity = 0.02 mm max for α6/3000; 0.07 mm max for α12/3000, α22/2000 and α30/3000
- Maximum radial load for output shaft is 70 kgf (31.8 lb) for α6/3000; 450 kgf (204 lb) for α12/3000, α22/2000 and α30/3000
- Taps for eyebolts are M8 by 15 mm deep; eyebolts are not attached.

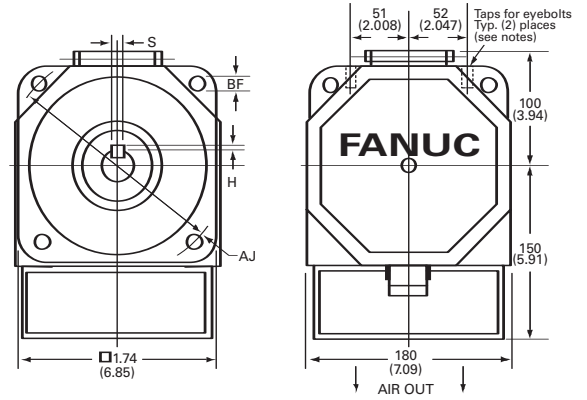
α Series Servo Motors

Dimensions

α40/2000 with fan



α40/2000 with fan, top and side views



α40/2000 with fan, front and rear views

Dimensions shown in mm (in)

Dimension	α40/2000 with fan
AH	79 (3.11)
AH with brake	79 (3.11)
AJ (dia.)	200 (7.874)
AK	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
AK with brake	114.3 ⁺⁰ _{-0.025} (4.50/4.499)
BB	3.2 (0.126)
BB with brake	3.2 (0.126)
BF (dia.)	13.5 (0.531)
H	3 ⁺⁰ _{-0.30} (0.1181/0.1063)
S	10 ⁺⁰ _{-0.036} (0.3937/0.3923)
U	35 ^{+0.01} ₋₀ (1.3784/1.3779)
U with brake	35 ^{+0.01} ₋₀ (1.3784/1.3779)
XD	70 (2.756)
XD with brake	70 (2.756)

Connector	Description
1	Motor AC Power Connector
2	Motor Encoder Feedback Connector
3	Brake Connector
4	Fan Connector

Notes

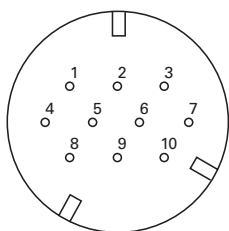
1. Shaft diameter runout = 0.05 mm max
2. Flange surface runout = 10.10 mm max
3. Maximum radial load for output shaft is 450 kgf (990 lb)
4. Taps for eyebolts are M8 by 15 mm deep; eyebolts are not attached.
5. Rabbet diameter eccentricity = 0.07 mm max
6. Direction of air flow is downward only.

Servo Motors

β is Series Servo Motors

Connections

Serial Encoder Connections

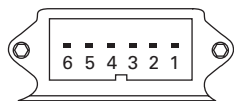


All β is Motors

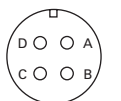
Description	β i Series Amplifier	
	β is Motors	JF1 Connector
N/C	2	1
N/C	1	2
RD	6	5
\overline{RD}	5	6
+5 VDC	8, 9	9, 20
0 VDC	7, 10	12, 14
+6 VA (battery)	4	7
Frame Ground	3	16
Cable Shield	3	16

GE Fanuc Mating Connector:
 A06B-6114-K204#E (90 degree)
 A06B-6114-K204#S (Straight)

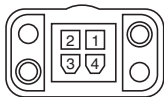
Power and Brake Connections



β 2is & β 4is Motor Power/Brake



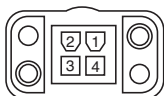
β 8is, β 12is & β 22is Motor Power



β 0.4is, β 0.5is & β 1is Motor Power



β 8is, β 12is & β 22is Brake



β 0.4is, β 0.5is & β 1is Brake

Description	β 0.4is, β 0.5is & β 1is	β 2is & β 4is	β 8is, β 12is, & β 22is	β i-Series Amplifier
	Motor Connector	Motor Connector	Motor Connector	Motor Connector
Phase U	1	1	A	U
Phase V	2	2	B	V
Phase W	3	3	C	W
Earth (case)	4	4	D	PE
Brake VDC	n/a	5	n/a	n/a
Brake VDC	n/a	6	n/a	n/a

GE Fanuc Mating Connector:
 A06B-6114-K220#E (90 degree) (β 2is, β 4is)
 A06B-6114-K220#S (Straight) (β 2is, β 4is)
 44A730464-G18 (β 8is, β 12is)
 A06B-6114-K230#E (β 0.4is, β 0.5is, β 1is)
 44A730464-G20 (β 22is)

Description	β 0.4is, β 0.5is & β 1is	β 8is, β 12is, & β 22is
	Motor Connector	Motor Connector
Brake VDC	1	1
Brake VDC	2	2
Earth (case)	4	4

GE Fanuc Mating Connector:
 A06B-6114-K213#E (90 degree) (β 8is, β 12is, β 22is)
 A06B-6114-K213#S (Straight) (β 8is, β 12is, β 22is)
 A06B-6114-K232#E (β 0.4is, β 0.5is, β 1is)

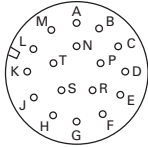
Brake power connections are not polarized 24 VDC.

Servo Motors

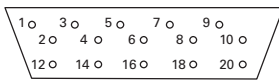
α Series Servo Motors

Connections

Serial Encoder Connections



α Motor

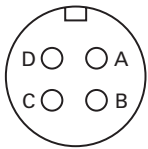


α Amplifier (JF1)

Description	Motor Connector Pin	Amplifier JF1 Connector
Serial Data (SD)	A	1
Serial Data (\overline{SD})	D	2
Request (REQ)	F	5
Request (\overline{REQ})	G	6
+5 VDC	J, K	18, 20
0 VDC	N, T	12, 14
0 VA (battery backup)	S	16
+6 VA (battery backup)	R	7
Cable Shield	H	N/C

GE Fanuc Mating Connector: 44A730464-G38
Amp: MS3108B-20-29SW

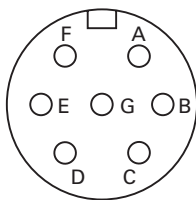
Power and Brake Connections



Power: α6, α12, α22, αC12

Description	Motor Connector Pin	α Amplifier T1 Terminal Board	β Amplifier CX11-3 Connector (αC12 only)
Phase U	A	9	U
Phase V	B	10	V
Phase W	C	11	W
Earth (case)	D	12	G

GE Fanuc Mating Connector: 44A730464-G20
DDK CE Series: CE02-6A22-22DS



Power: α30 and α40

Description	Motor Connector Pin	Amplifier T1 Terminal Board
Phase U	A	9
Phase U	B	9
Phase V	C	10
Phase V	D	10
Phase W	E	11
Phase W	F	11
Earth (case)	G	12

GE Fanuc Mating Connector: 44A730464-G21
DDK CE Series: CE02-6A24-10GS



Brake

Description	Motor Connector Pin
Brake VDC	A
Brake VDC	B
Earth (case)	C

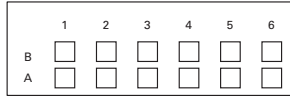
GE Fanuc Mating Connector: 44A730464-G26
Amp: MS3102A-10SL-3P

Servo Motors

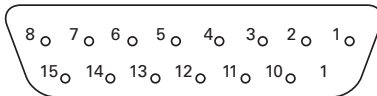
β Series Servo Motors

Connections

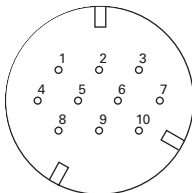
Serial Encoder Connections



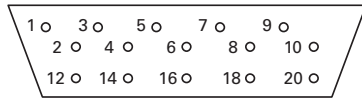
β0.5 Motor



β2, β3 & β6 Motor

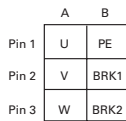


βM Motors



β Amplifier (JF1)

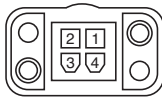
Power and Brake Connections



β0.5 Motor Power/Brake



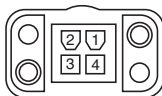
β2, β3 & β6 Motor Power



βM Motor Power



β2, β3 & β6 Brake



βM Brake

Description	βM Motor	βM0.5 Motor Connector	β2, β3 & β6 Motor Connector	β Amplifier JF1 Connector
Serial Data (SD)	2	A4	12	1
Serial Data (SD)	1	B4	13	2
Request (REQ)	6	A3	5	5
Request (REQ)	5	B3	6	6
+5 VDC	8, 9	A2, B2	8, 15	9, 18
0 VDC	7, 10	A1, B1	1, 2	12, 14
+6 VA (battery)	4	A5	14	7
0 VA (battery)	N/C	A6	10	16
Cable Shield	N/C	B6	4	N/C

GE Fanuc Mating Connector: A06B-6050-K120 (β0.5)
 A06B-6050-K115 (β2, β3, β6)
 A06B-6114-K204#E (90 degree) (βM)
 A06B-6114-K204#S (Straight) (βM)

Description	βM Motor Connector	βM0.5 Motor Connector	β2, β3 & β6 Motor Connector	β Amplifier CX11-3 Connector
Phase U	1	A1	A	U
Phase V	2	A2	B	V
Phase W	3	A3	C	W
Earth (case)	4	B1	D	PE
Brake VDC	n/a	B2	n/a	n/a
Brake VDC	n/a	B2	n/a	n/a

GE Fanuc Mating Connector: A06B-6050-K119 (β0.5)
 44A730464-G18 (β2, β3, β6)
 A06B-6114-K230#E (βM)

Description	βM Motor Connector	β2, β3 & β6 Motor Connector
Brake VDC	1	A
Brake VDC	2	B
Earth (case)	4	C

GE Fanuc Mating Connector: 44A730464-G26 (β2, β3, β6)
 A06B-6114-K232#E (βM)

Brake power connections are not provided.

Servo Motors

β i Series Servo Motors

Ordering Information

Model Number	Description
A06B-0114-B203	β 0.4/5000is Servo Motor
A06B-0114-B503	β 0.4/5000is Servo Motor with Brake
A06B-0115-B203	β 0.5/5000is Servo Motor
A06B-0115-B503	β 0.5/5000is Servo Motor with Brake
A06B-0116-B203	β 1/5000is Servo Motor
A06B-0116-B503	β 1/5000is Servo Motor with Brake
A06B-0061-B203	β 2/4000is Servo Motor
A06B-0061-B503	β 2/4000is Servo Motor with Brake
A06B-0063-B203	β 4/4000is Servo Motor
A06B-0063-B503	β 4/4000is Servo Motor with Brake
A06B-0075-B203	β 8/3000is Servo Motor
A06B-0075-B503	β 8/3000is Servo Motor with Brake
A06B-0078-B203	β 12/3000is Servo Motor
A06B-0078-B503	β 12/3000is Servo Motor with Brake
A06B-0085-B203	β 22/2000is Servo Motor
A06B-0085-B503	β 22/2000is Servo Motor with Brake

α Series Servo Motors

Ordering Information

Model Number	Description
A06B-0128-B575#7008	α 6/3000 Servo Motor
A06B-0128-B675#7008	α 6/3000 Servo Motor with Brake
A06B-0128-B575#7076	α 6/3000 Servo Motor, IP67 Sealing
A06B-0128-B675#7076	α 6/3000 Servo Motor with Brake, IP67 Sealing
A06B-0141-B075#7008	α C12/2000 Servo Motor
A06B-0141-B175#7008	α C12/2000 Servo Motor with Brake
A06B-0143-B075#7008	α 12/3000 Servo Motor
A06B-0143-B175#7008	α 12/3000 Servo Motor with Brake
A06B-0143-B075#7076	α 12/3000 Servo Motor, IP67 Sealing
A06B-0143-B175#7076	α 12/3000 Servo Motor with Brake, IP67 Sealing
A06B-0147-B075#7008	α 22/2000 Servo Motor
A06B-0147-B175#7008	α 22/2000 Servo Motor with Brake
A06B-0147-B075#7076	α 22/2000 Servo Motor, IP67 Sealing
A06B-0147-B175#7076	α 22/2000 Servo Motor with Brake, IP67 Sealing
A06B-0153-B075#7008	α 30/3000 Servo Motor
A06B-0153-B175#7008	α 30/3000 Servo Motor with Brake
A06B-0153-B075#7076	α 30/3000 Servo Motor, IP67 Sealing
A06B-0153-B175#7076	α 30/3000 Servo Motor with Brake, IP67 Sealing
A06B-0158-B075#7008	α 40/2000 Servo Motor with Fan
A06B-0158-B175#7008	α 40/2000 Servo Motor with Fan and Brake

β Series Servo Motors

Ordering Information

Model Number	Description
A06B-0115-B075#0008	β M0.5/4000 Servo Motor
A06B-0115-B175#0008	β M0.5/4000 Servo Motor with Brake
A06B-0116-B075#0008	β M1/4000 Servo Motor
A06B-0116-B175#0008	β M1/4000 Servo Motor with Brake
A06B-0113-B075#7008	β 0.5/3000 Servo Motor
A06B-0113-B175#7008	β 0.5/3000 Servo Motor with Brake
A06B-0032-B075#7008	β 2/3000 Servo Motor
A06B-0032-B175#7008	β 2/3000 Servo Motor with Brake
A06B-0033-B075#7008	β 3/3000 Servo Motor
A06B-0033-B175#7008	β 3/3000 Servo Motor with Brake
A06B-0034-B075#7008	β 6/2000 Servo Motor
A06B-0034-B175#7008	β 6/2000 Servo Motor with Brake

Stepping Amplifiers and Motors

GE Fanuc MTR-Series Stepping solutions provide an economical open loop alternative when the performance of a servo is not required. Stepping motors systems are easy to set up, do not require the tuning that is typical with servo motors and provide cost effective solutions for a variety of automation applications.



The Power Cube offers full or half step selection in a very compact package while the S2K Stepping Motor Controller provides microstepping for applications requiring improved smoothness and resolution. When matched with the MTR-Series stepping motors these solutions provide unparalleled performance in the field of stepping motor technology and are ideal for demanding automation applications.

and communications in a single compact package. The Stepping Motor Cube is available in pulse command input formats or with an integral DeviceNet communications interface. Providing multi-axis networked motion solutions has never been easier. Besides saving valuable panel space the Stepping Motor Cube also reduces system wiring and integration costs.

The unique Stepping Motor Cube provides the space-saving advantage of integrating a stepping amplifier, control, motor

- NEMA 23 and 34 motor mountings mate easily to off the shelf gearheads
- Power Cube requires DC power only - excellent for battery based applications!
- 50,000 Microsteps when used with the S2K Series provides enhanced resolution and accuracy
- Stepping motor holding torque range from 61–3074 oz-in (0.43–21.7 Nm)

APPLICATIONS

- Packaging
- Test equipment
- Automatic fixturing
- Material handling
- Index table
- Feed-to-length
- Light assembly
- Semiconductor
- Electronic manufacturing
- and many more

Power Cube Stepping Amplifiers

Stepper Performance in a Space-Saving Package

The Power Cube Stepping Motor-Drive Package provides a cost-effective solution for typical OEM stepping motor applications in a rugged and easy to install package.

The Power Cube is ideal for high volume applications such as packaging, test equipment, automatic fixturing and material handling. The Power Cube drive accepts pulse and direction inputs from an external pulse source such as the GE Fanuc Operator Control Station (OCS) stepping control module. Unlike many low-cost stepping motor drives, the Power Cube is a high performance bipolar chopper design. This drive design maintains constant current in a wide range of

operating conditions and provides better high-speed performance than other similar drive designs. Optional high performance MTR-Series stepping motors are matched to the drive characteristics to provide optimum performance. Like all other GE Fanuc motor products, these motors provide maximum power in a minimum frame size. They also incorporate exceptional heat dissipation capability.



Features

- Low cost stepping drive and motor for OEM applications
- High performance bipolar chopper translator rated at 4 Amps continuous
- Accepts power supply input voltages from 12-48 VDC
- Rugged design for demanding applications
- Full and half-step user configurable modes
- On-board potentiometer or remote inputs can be used for control

Like all GE Fanuc products, the Power Cube incorporates key design features to provide the flexibility, performance and serviceability demanded by industrial users. These features include:

- Completely packaged drive unit with heat sink
- Optically isolated inputs for noise immunity
- Overtemperature, overcurrent and overvoltage protection
- Quick disconnect terminals for ease of installation and replacement
- Optional MTR-Series motors and cables simplify system integration

Stepping Amplifiers

Power Cube

Features

Specifications

Pulse and Direction Inputs

Input Format	+4 VDC pulse/direction; +24 VDC pulse/direction differential, optically isolated
Input Voltage Range	3.5-4.2 VDC for +4 V input; 12-30 VDC for +24 V input
Maximum Input Pulse Rate	50 kHz
Minimum Pulse Width	5 microseconds

Digital Inputs and Outputs

Dedicated Inputs	Enable, power save
Dedicated Outputs	OK, Stall
Operating Range	4-24 VDC, 30 VDC Maximum
Interface Format	optically isolated, source/sink user configurable
Maximum Off Input Voltage	1 VDC
Minimum On Input Voltage	4 VDC
Input Load	1k Ohms
Maximum On Output Resistance	35 Ohms
Maximum Load Output Current	100 mA
Maximum Off Output Leakage Current	200 nA

Step Size Selection

A	B	Step Size
open	open	Full Stepping (200 steps/rev)
open	short	Half Stepping (400 steps/rev)
short	open	Microstepping (1,000 steps/rev)

short = Connect to Step Size Common

DC Input Power Requirements

Drive	24 VDC \pm 20% @ 3.1 Amps max. ¹ 48 VDC \pm 10% @ 3.1 Amps max. ¹
Overvoltage Threshold	54 VDC \pm 2 VDC
Undervoltage Threshold	18 VDC \pm 2 VDC

Output Power

Voltage range	17 to 38 Vrms 2 phase
Frequency	0-8 kHz fundamental (16.4 kHz PWM)
Current 2	4 A rms per phase

Environmental Specifications

Operating Temperature, Free Air Ambient	0 to 50° C @ 3 Amps 1 to 45° C @ 4 Amps
Storage and Shipping Temperature	-40 to 80° C
Enclosure Type	Encapsulated

Motor Compatibility and Configuration

Stepping Motor	DIP Switch Location				Connection	Amps RMS at 100% Current	Amps RMS at 60% current	Stall Velocity Threshold RPS
	1	2	4	PRG				
MTR-1216	Off	Off	Off	Off	Parallel	2.5	1.5	9
MTR-1220	On	Off	Off	Off	Series	2.5	1.5	4
MTR-1221	Off	On	Off	Off	Parallel	3.5	2.1	4
MTR-1235	On	On	Off	Off	Series	3.0	1.8	3
MTR-1231	Off	Off	On	Off	Parallel	3.1	1.9	3
MTR-1331-J	On	Off	On	Off	Series	4.0	2.4	4
MTR-1N31-I	Off	On	On	Off	Series	4.0	2.4	4
Reserved	On	On	On	Off	TBD	TBD	TBD	TBD

¹ DC input power has undervoltage and overvoltage detection.

² The outputs are provided with internal overload protection.

ORDERING INFORMATION

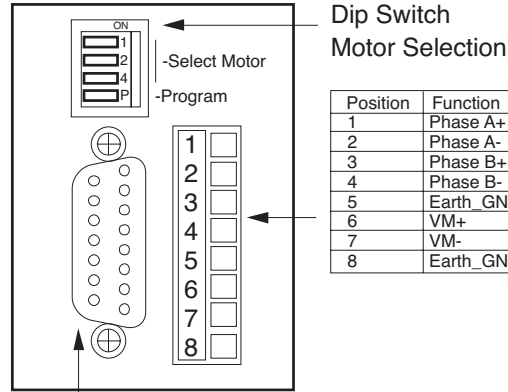
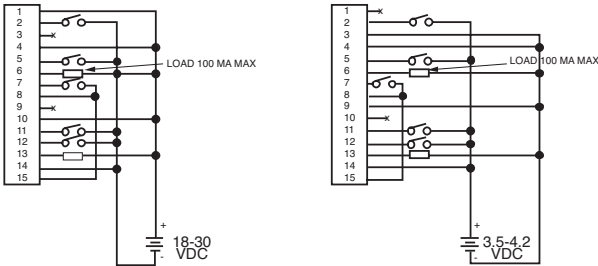
Power Cube	IC800PCUB00300
DIN Rail Mounting Plate	IC800PCUBDINMTG
DB15 to Screw Terminal Adapter	IC800CUBDB15ADP

Stepping Amplifiers

Power Cube

Connections

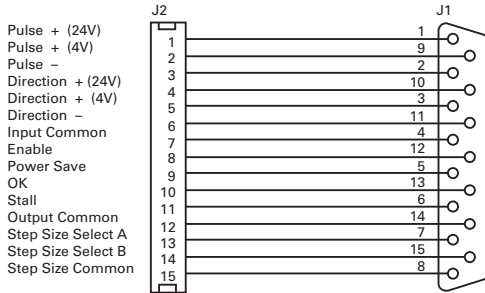
Discrete Inputs and Outputs



Position	Function
1	Phase A+
2	Phase A-
3	Phase B+
4	Phase B-
5	Earth_GND
6	VM+
7	VM-
8	Earth_GND

IC800CUBDB15ADP

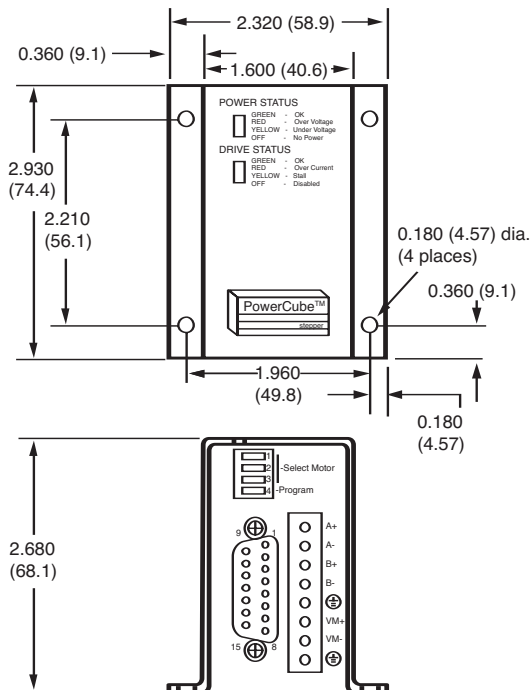
Optional DB15 to Screw Terminal Adapter



DB15 PINOUT	
1	Pulse + (24V)
9	Pulse + (4V)
2	Pulse -
10	Direction + (24V)
3	Direction + (4V)
11	Direction -
4	Input Common
12	Enable Input
5	Power Save
13	OK Output
6	Stall Output
14	Output Common
7	Step Size Select A
15	Step Size Select B
8	Step Size Common

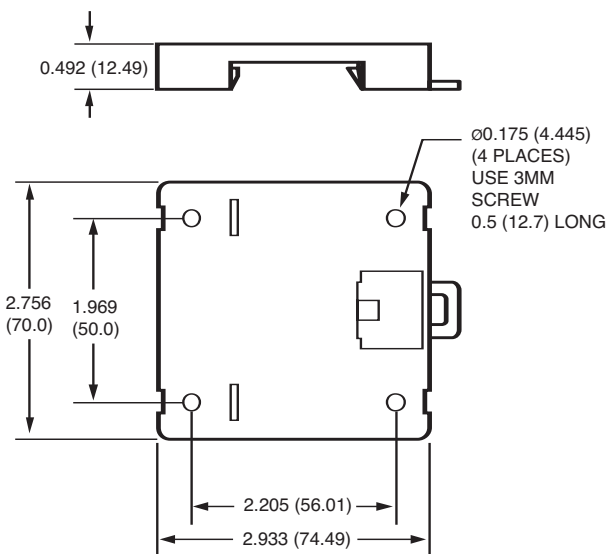
Mechanical Specifications

Dimensions in inches (mm)



Weight = 12 oz. (0.34kg)

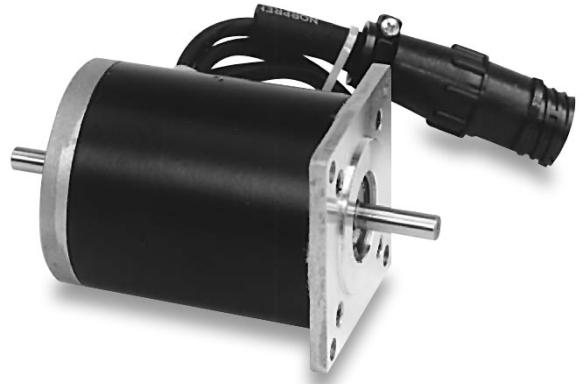
IC800PCUBDINMTG Optional DIN Rail Mount Plate



MTR-Series Stepping Motors

High Performance at an Economical Price

The GE Fanuc MTR-Series Stepping Motors provide unparalleled performance in the field of stepping motor technology and are ideal for the demanding automation applications requiring precision positioning and/or velocity control. Higher speed capability and compact size provide performance capabilities not previously attainable.



Features

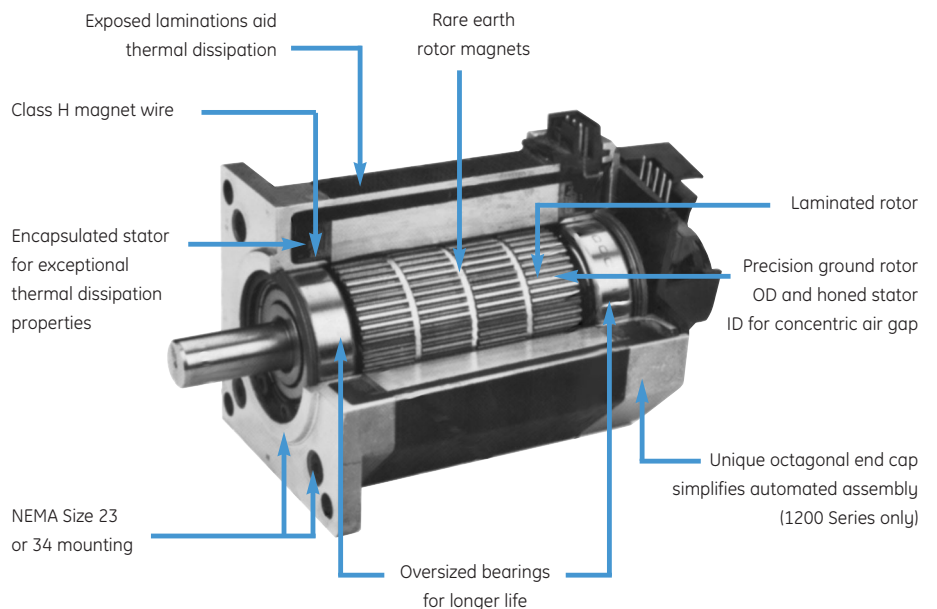
- Low inertia design for improved machine cycle rates
- Fully connectorized for easy installation
- Long life oversized bearings and high temperature insulation for superior reliability
- Exposed laminations for improved heat dissipation
- Economical design without sacrificing performance
- Brushless design minimizes maintenance
- Optional 500 ppr Encoder

Stepping motors provide a low cost alternative for automation applications requiring high torque without the high speed provided by servo motors. In addition, steppers can operate open loop, which means they do not require the cost of the motor position feedback device necessary with servo systems.

Stepping motors are easy to set up and do not require the tuning that is typical with servo motors and provide solutions for a variety of automation applications when used with GE Fanuc motion control products. The Power Cube is user-configurable for half-stepping when applications require improved smoothness and resolution. For further performance enhancement, the S2K Stepping Motor Controller implements microstepping technology for 50,000 steps per revolution.

MTR-Series high torque stepping motors incorporate many design features to enhance reliability and performance. High energy product rare earth magnets provide high torque-to-inertia ratios for

exceptional machine cycle rates. Rare earth magnet inserts in the stator increase torque production resulting in maximum power in the minimum motor size.



Stepping Motors

MTR-Series Stepping Motors

Features

Specifications for Stepping Motors used with Power Cube Amplifier

Specification	Units	MTR-1216-D	MTR-1220-D	MTR-1221-D	MTR-1231-D	MTR-1235-D	MTR-1331-J-D	MTR-1N31-I-D
Holding Torque ¹	oz-in (Nm)	61 (0.43)	116 (0.82)	124 (0.87)	236 (1.68)	185 (1.31)	327 (2.31)	605 (4.27)
Inertia	oz-in-sec ² (kg-m ² x 10 ⁻³)	0.0010 (0.007)	0.0015 (0.011)	0.0017 (0.012)	0.0036 (0.025)	0.0170 (0.012)	0.0202 (0.014)	0.0202 (0.014)
Winding	Parallel/Series	Parallel	Series	Parallel	Parallel	Series	Series	Series
Rated Current/Phase	Amps	2.5	2.7	1.8	1.6	3.4	4.2	4.3
Phase Resistance ²	Ohms	0.84	0.76	2.12	3.12	0.68	0.52	0.72
Phase Inductance	mH	2.3	2.5	8.0	12.4	2.4	4.4	5.8
Detent Torque	oz-in (Nm)	2.5 (0.018)	4.8 (0.034)	9.4 (0.066)	17 (0.12)	4.6 (0.32)	22 (0.16)	18 (0.13)
Number of Phases	n/a	2	2	2	2	2	2	2
Number of Poles	n/a	50	50	50	50	50	50	50
Full Steps per Revolution	Steps	200	200	200	200	200	200	200
Full Step Angle	Degrees	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Weight	lb (kg)	1.0 (0.45)	1.2 (0.55)	1.5 (0.68)	2.5 (1.13)	2.1 (0.95)	3.2 (1.45)	5.0 (2.27)
Encoder Option	500 ppr, Incremental, Dual Channel Quadrature with Index, +5V ±10%, 100KHZ max freq., TTL Compatible							

Specifications for Stepping Motors used with S2K Series

Specification	Units	MTR-1221-D	MTR-1231-D	MTR-1324-D	MTR-1337-D	MTR-1350-A	MTR-1350-D	MTR-1N31-I-D	MTR-1N32-I-D	MTR-1N41-G-A	MTR-1N42-H-A
Holding Torque ¹	oz-in (Nm)	144 (1.02)	238 (1.68)	335 (2.37)	675 (4.77)	630 (4.45)	995 (7.02)	650 (4.59)	1200 (8.47)	1905 (13.45)	3074 (21.71)
Inertia	oz-in-sec ² (kg-m ² x 10 ⁻³)	0.0017 (0.012)	0.0036 (0.025)	0.0083 (0.059)	0.0170 (0.12)	0.0250 (0.176)	0.0250 (0.176)	0.0202 (0.14)	0.038 (0.27)	0.0783 (0.55)	0.1546 (1.09)
Rated Current/Phase	Amps	1.8	1.6	2.7	4.1	7.9	4.0	4.3	4.1	5.0	5.0
Phase Resistance ²	Ohms	2.12	3.12	1.12	0.74	0.26	1.02	0.72	1.03	0.58	0.6
Phase Inductance	mH	8.0	12.4	10.0	8.9	3.1	12.6	5.8	10.3	7.8	9.8
Detent Torque	oz-in (Nm)	9.4 (0.066)	17 (0.12)	22 (0.16)	42 (0.3)	64 (0.45)	64 (0.45)	18 (0.13)	36 (0.25)	65 (0.46)	126 (0.89)
Number of Phases	n/a	2	2	2	2	2	2	2	2	2	2
Number of Poles	n/a	50	50	50	50	50	50	50	50	50	50
Full Steps per Revolution	Steps	200	200	200	200	200	200	200	200	200	200
Full Step Angle	Degrees	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Weight	lb (kg)	1.5 (0.68)	2.5 (1.13)	3.2 (1.45)	5.3 (2.41)	7.6 (3.45)	7.6 (3.45)	5.0 (2.27)	8.4 (3.81)	11 (4.98)	18.4 (8.34)
Encoder Option	500 ppr, Incremental, Dual Channel Quadrature with Index, +5V ±10%, 100KHZ max freq., TTL Compatible										

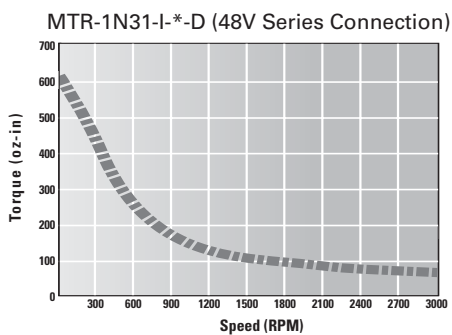
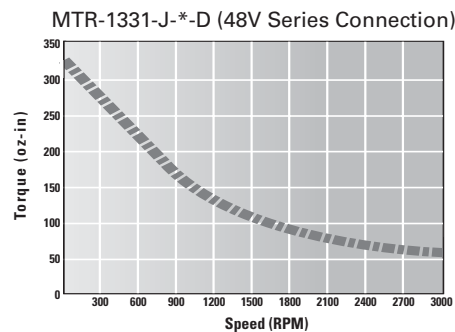
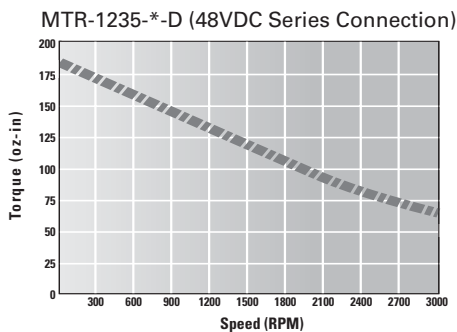
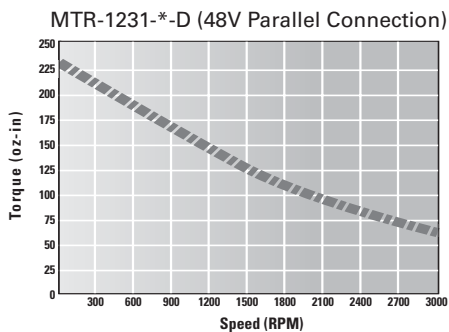
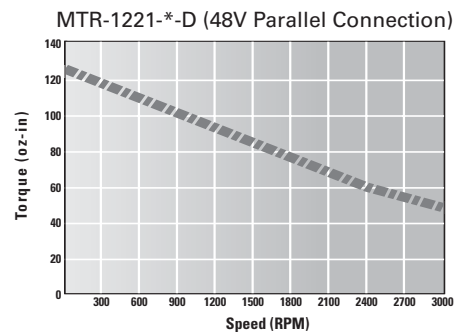
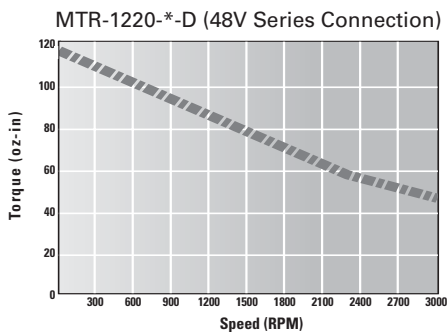
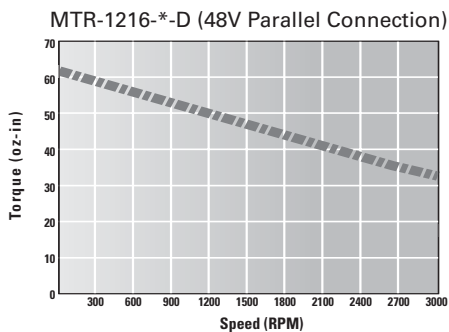
All ratings typical at 25°C unless otherwise noted.

¹ Holding torque specified for motor winding temperature at 130°C and motor unmounted in still air at 40°C

² Phase resistance with winding at 130°C and motor in still air at 40°C

MTR-Series Stepping Motors

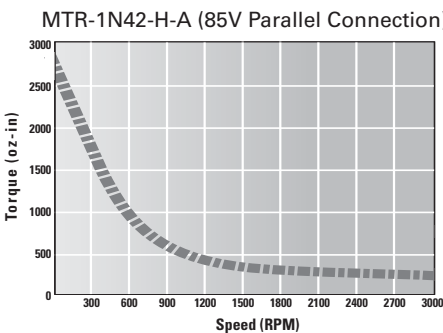
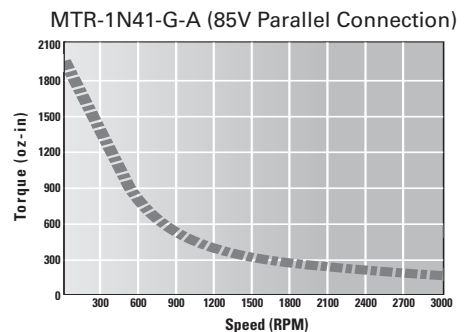
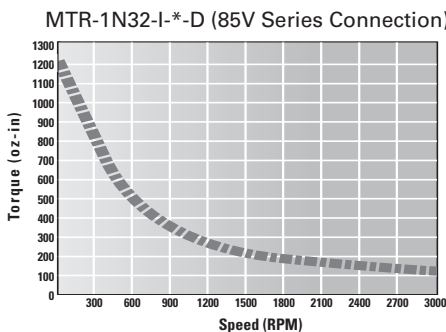
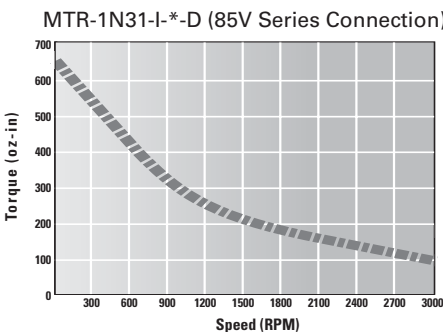
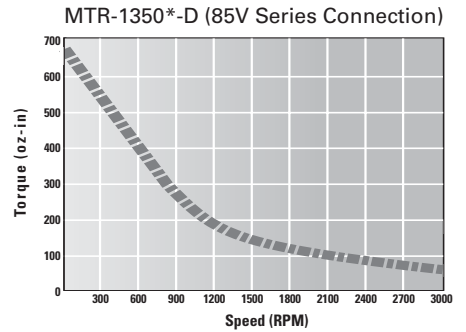
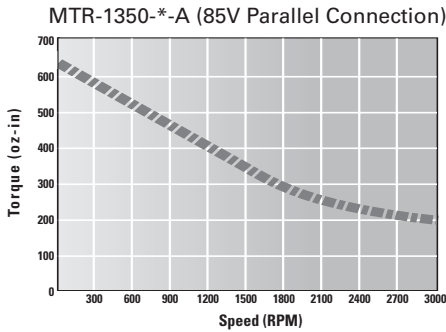
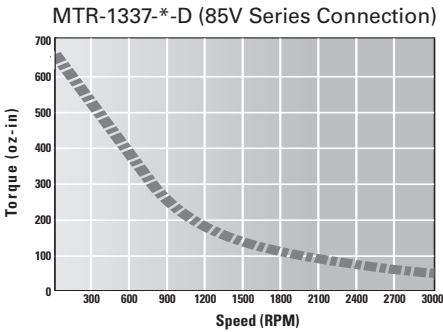
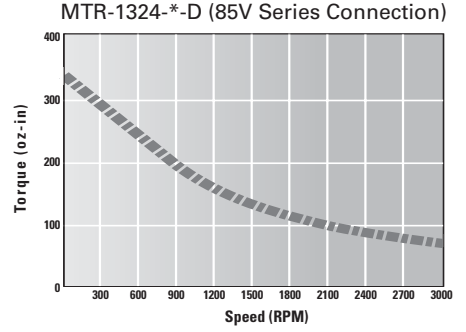
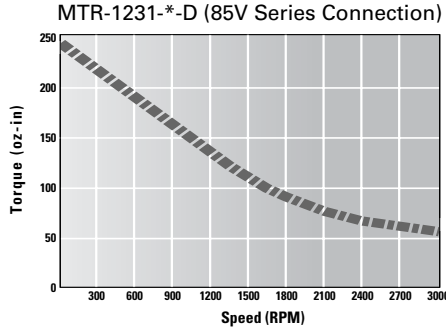
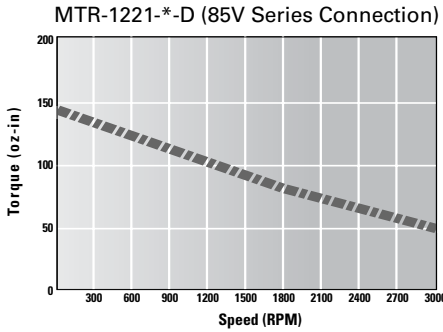
Speed Torque Curves for Power Cube Amplifier



Stepping Motors

MTR-Series Stepping Motors

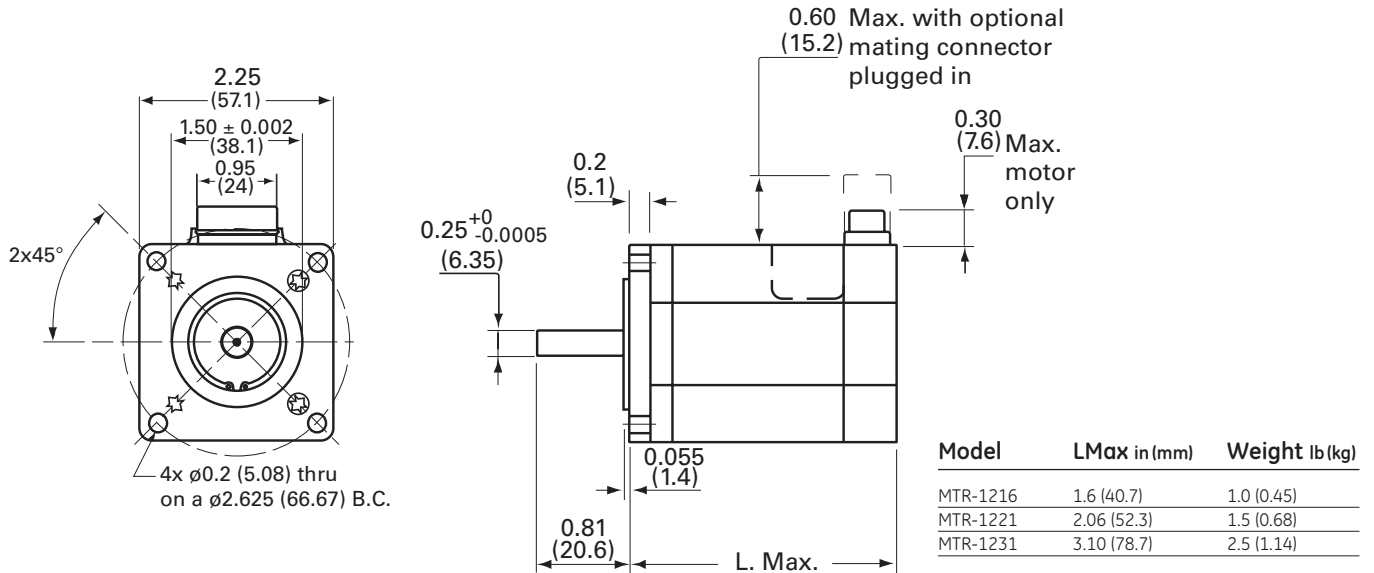
Speed Torque Curves for S2K Amplifier/Controllers



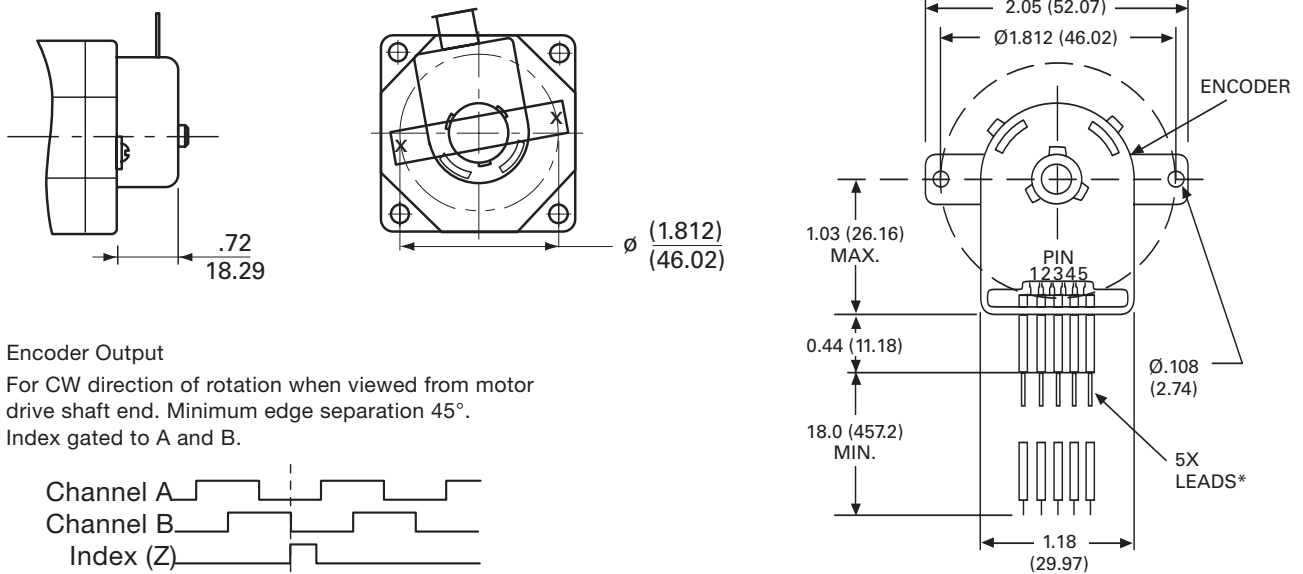
Stepping Motors

MTR-Series

MTR-1216, 1221 & 1231 Stepping Motor Dimensions NEMA 23 Flange

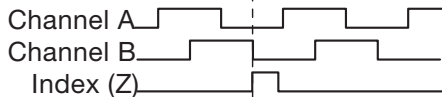


Encoder Option



Encoder Output

For CW direction of rotation when viewed from motor drive shaft end. Minimum edge separation 45°. Index gated to A and B.



Pin	Function
1	Ground
2	Z
3	A
4	+5V
5	B

*Leads are terminated with 18 inch (457mm) long Agilent Technologies HEDS-8903 connector/cable. Encoder terminals are 0.025 inch square pins on 0.100 inch centers.

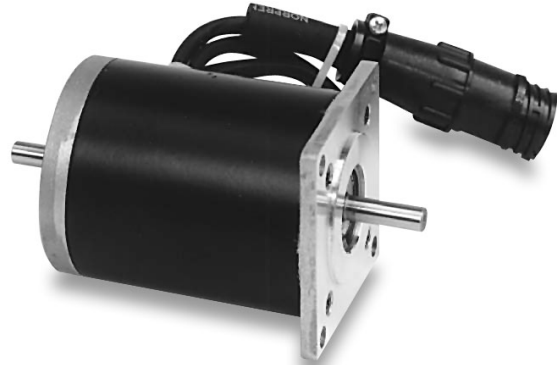
Stepping Motors

MTR-Series

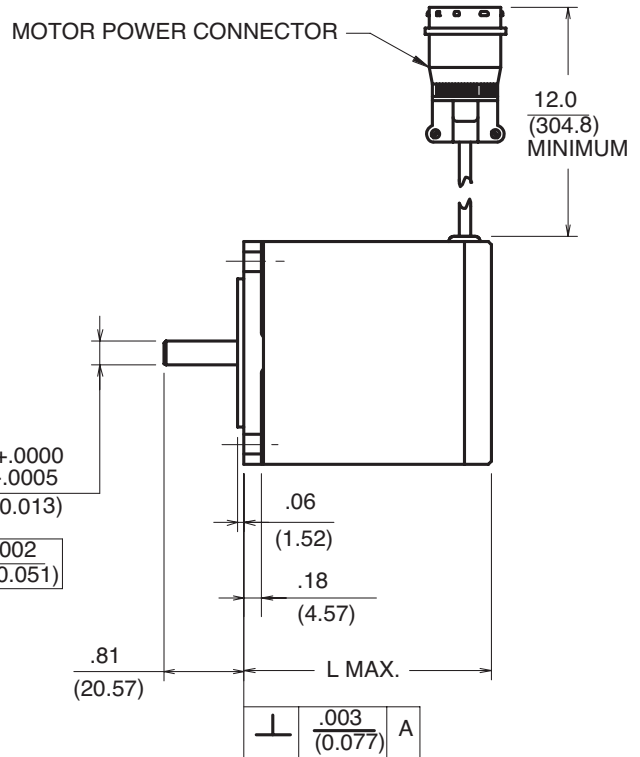
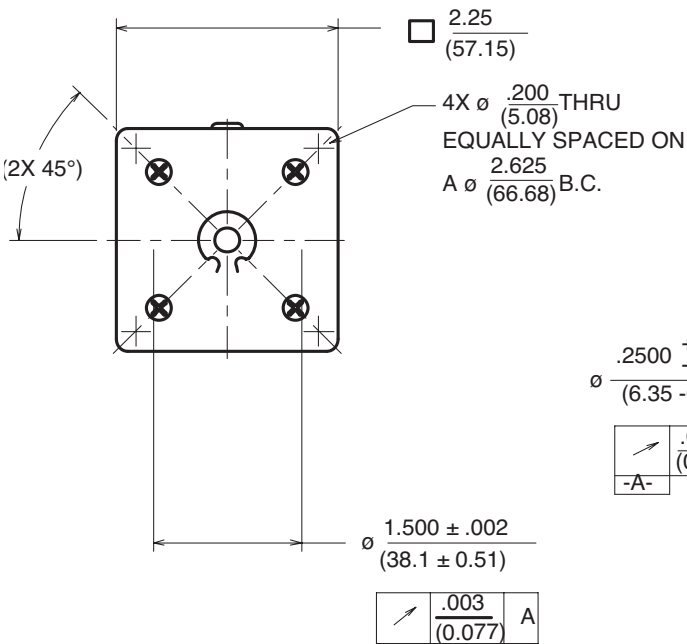
MTR-1220 and 1235 Series Stepping Motor Dimensions
NEMA 23 Flange - Standard Construction

Model	LMax in (mm)	Weight lb (kg)
MTR-1220	2.06 (52.3)	1.2 (0.55)
MTR-1235	3.06 (77.7)	2.1 (0.95)

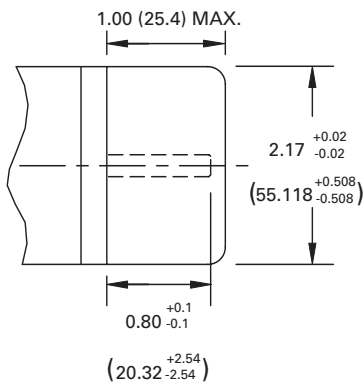
Metric dimensions shown beneath



Encoder Option



Encoder Option

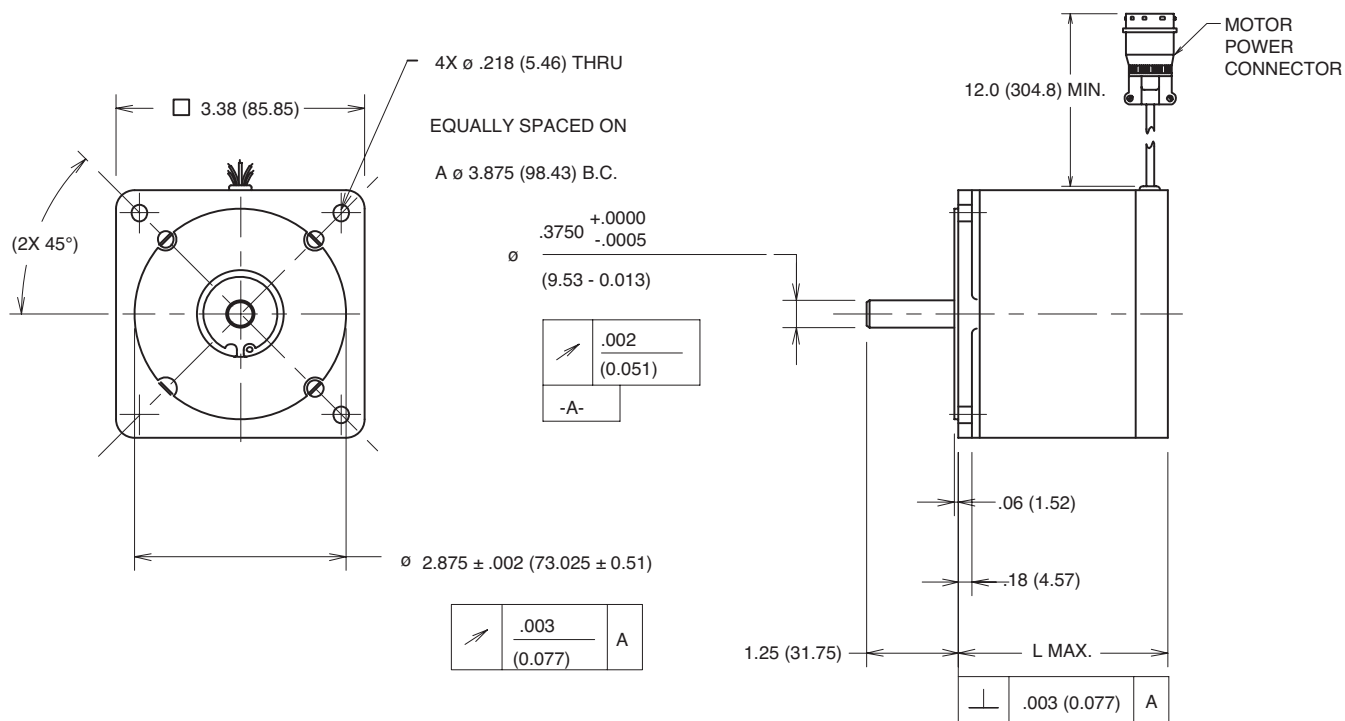


Stepping Motors

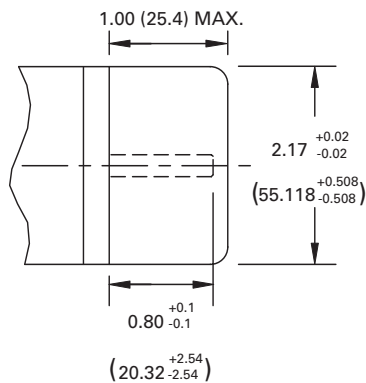
MTR-Series

MTR-1300 Series Stepping Motor Dimensions NEMA 34 flange - Standard Construction

Model	LMax in (mm)	Weight lb (kg)
MTR-1324	2.58 (65.5)	3.2 (1.45)
MTR-1337	3.76 (95.5)	5.3 (2.4)
MTR-1350	5.06 (128.5)	7.6 (3.45)



Encoder Option

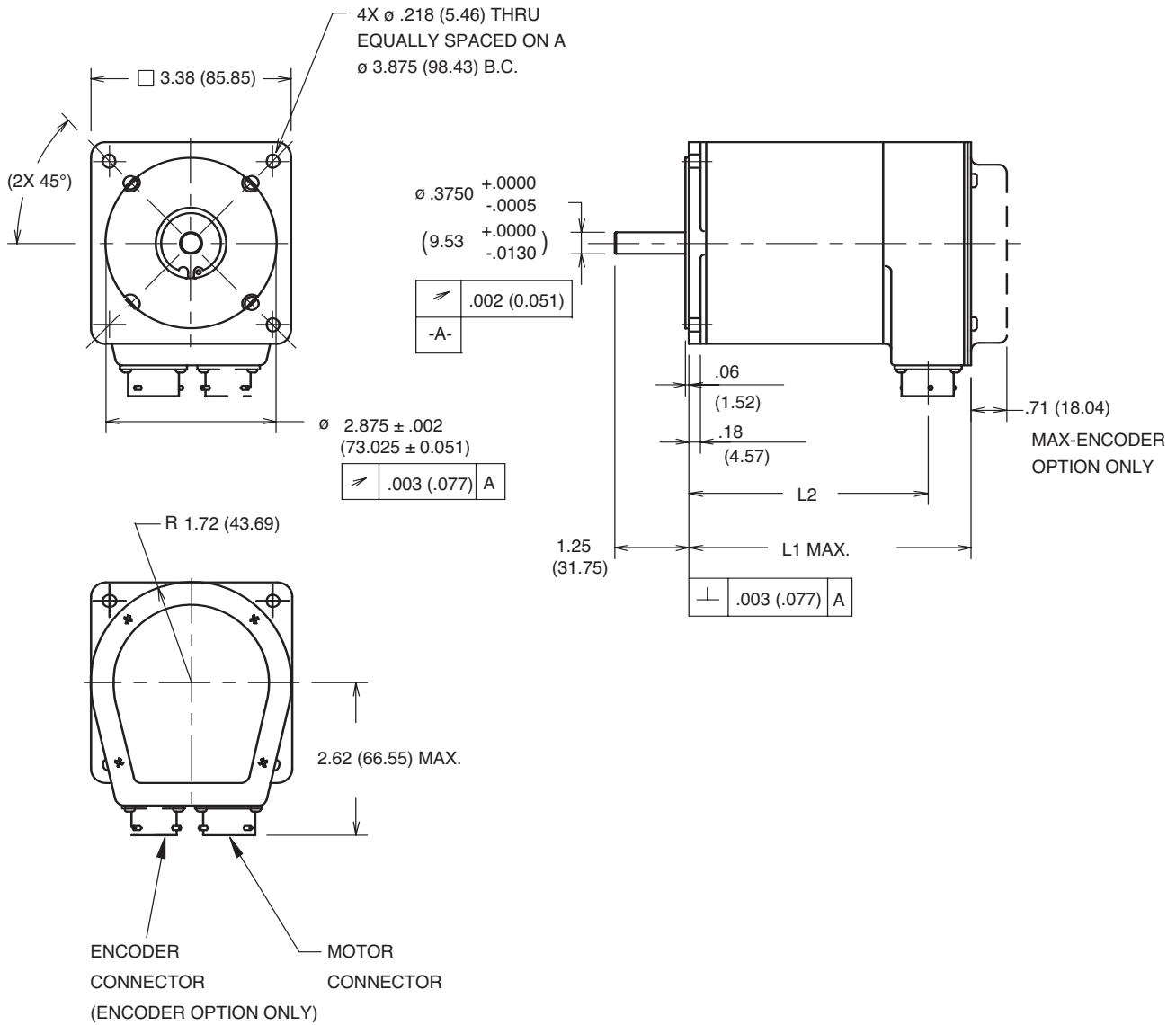


Stepping Motors

MTR-Series

MTR-1300 Series Stepping Motor Dimensions
NEMA 34 flange - Splashproof Construction

Model	L1 Max. in (mm)	L2 in (mm)	Weight lb (kg)
MTR-1324	3.6 (91.4)	2.87 (72.9)	3.2 (1.45)
MTR-1337	4.77 (121.2)	4.02 (102.1)	5.3 (2.4)
MTR-1350	6.05 (153.7)	5.30 (134.6)	7.6 (3.45)

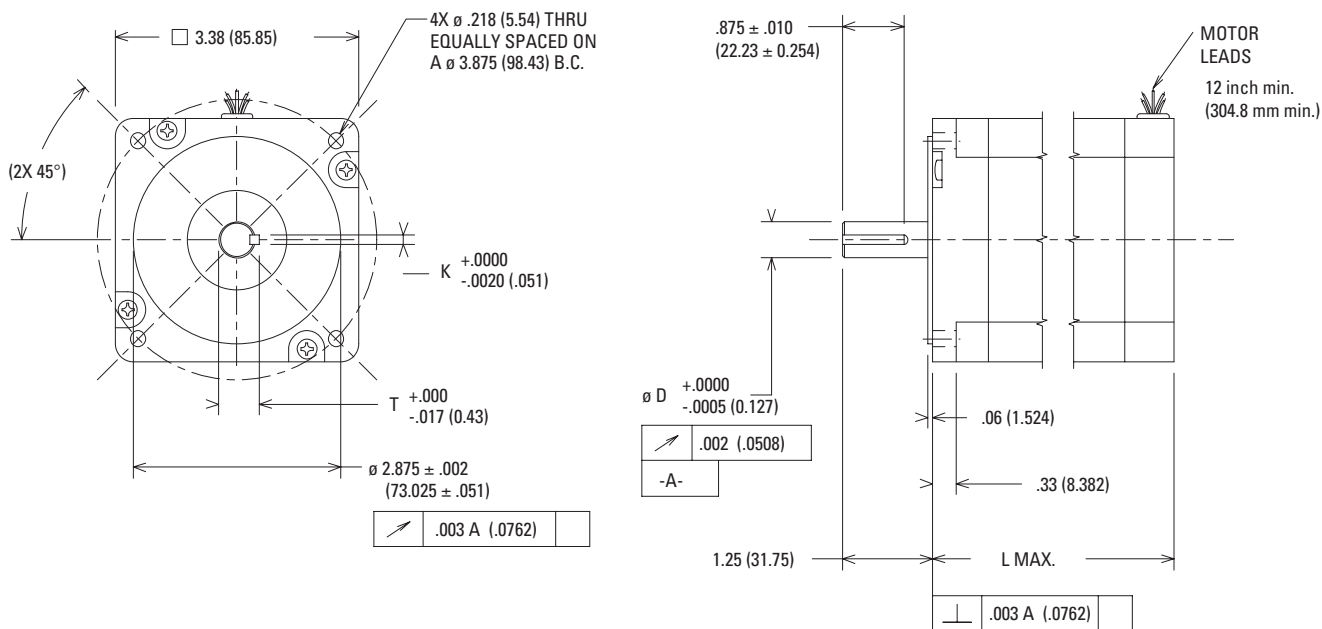


Stepping Motors

MTR-Series

MTR-1N3x Series Stepping Motor Dimensions

Model	D in (mm)	K	T	L Max.	Weight lb (Kg)
MTR-1N31	.5000 (12.7)	.1250 (3.81)	.555 (14.097)	3.13 (79.50)	5.0 (2.27)
MTR-1N32	.5000 (12.7)	.1250 (3.81)	.555 (14.097)	4.65 (118.11)	8.4 (3.81)

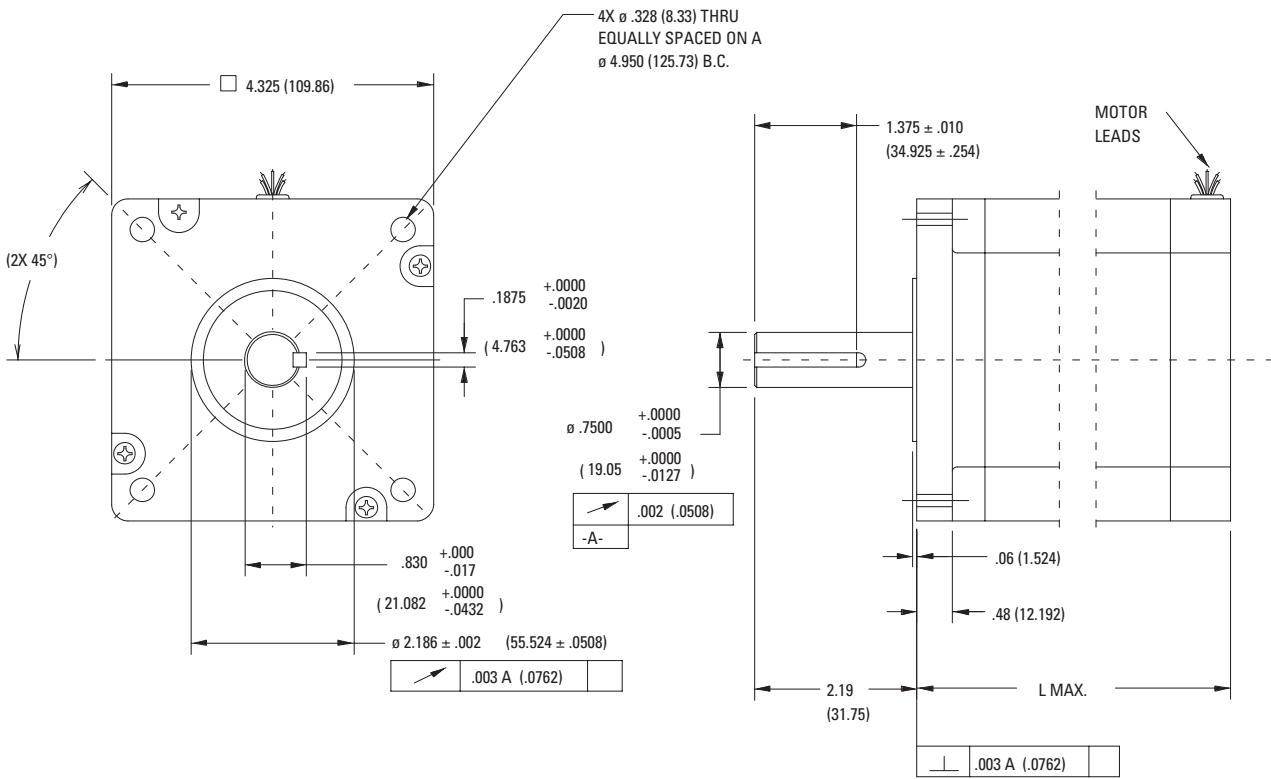


Stepping Motors

MTR-Series

MTR-1N4x Series Stepping Motor Dimensions

Model	LMax in (mm)	Weight lb (kg)
MTR-1N41	3.89 (98.81)	11 (4.98)
MTR-1N42	5.91 (150.11)	18.4 (8.34)



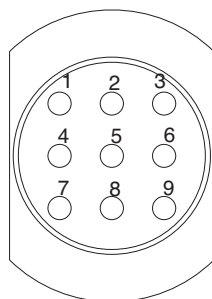
Stepping Motors

MTR Series Stepping Motors

Connections

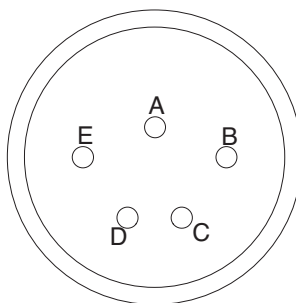
Motor Power

Standard Construction: MTR-1220, MTR-1235, MTR-1300 and MTR-1N Series



Pin	Function
1	A+
2	n/c
3	A-
4	n/c
5	Ground
6	n/c
7	B+
8	n/c
9	B-

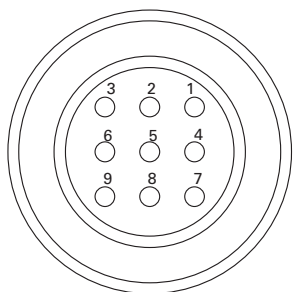
Splashproof Construction: MTR-1300



Pin	Function
A	A+
B	A-
C	B+
D	B-
E	Ground

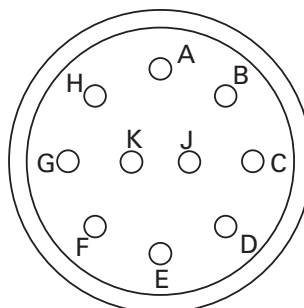
Encoder (500 line)

Standard Construction: MTR-1220, MTR-1235, MTR-1300 and MTR-1N Series



Pin	Function
1	Channel A+
2	Channel A-
3	Channel B+
4	Channel B-
5	+5 VDC
6	Ground
7	Index +
8	Index -
9	n/c

Splashproof Construction: MTR-1300



Pin	Function
A	Channel A+
B	Channel A-
C	Channel B+
D	Channel B-
E	Index +
F	Index -
G	+5 VDC
H	Ground
J	n/c
K	n/c

Stepping Motors

Stepping Motor Systems

Cable Resistance and the Performance

The cable used to connect a stepping motor driver to the motor itself is a critical system component. A poor cable choice can rob an otherwise well-designed system of torque and power and seriously degrade system reliability. Among the many cable issues that must be considered, such as flexibility and environmental factors, the system

designer must choose a cable with the proper electrical resistance for the application. This is especially important in stepping motor systems. Let's review the effects of cable resistance in stepping motor systems and learn how to select the proper resistance for your application.

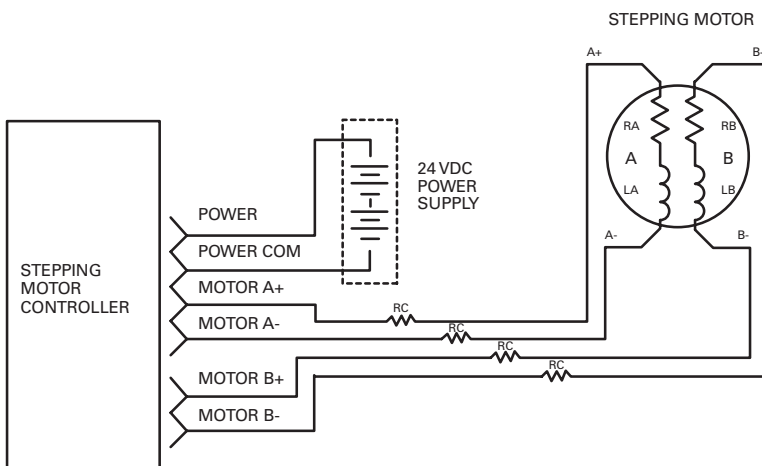
Cable Resistance Limits the Voltage Available to the Motor

Every cable exhibits electrical capacitance, inductance, and resistance, all of which can degrade the performance of a stepping motor system. In most cases, the effect of the capacitance and inductance are small compared to the inductance and capacitance of the motor, and thus have a relatively small effect on the system performance. It is the cable resistance that has the most effect on motor performance.

Unlike servo motor systems that provide motor current on a demand basis, stepping motor systems are designed to supply a constant current to the motor. This current multiplied by the cable resistance results in a voltage drop that subtracts directly from the voltage available to run the motor. The effect is to lower the maximum speed at which the motor can run and the maximum torque the motor can produce.

An Example Case

Suppose we have a stepping motor wired as shown in the figure below.



The controller is connected to a motor through 100 ft of a cable with four #20 AWG conductors. The motor is designed to operate at 5 amps per phase. Number 20 AWG copper wire has a resistance of about 10 ohms per 1000ft . There is 200ft of this wire in series with each motor phase (100 ft in series with each of the two phase leads) for a total resistance of 2 ohms per phase. Using Ohm's law, we can calculate the voltage drop due to the cable resistance:

$$I_{\text{cable}} = I_{\text{motor}} = 5 \text{ amps}$$

$$R_{\text{cable}} = (10 / 1000 \text{ ohms per foot}) * 200 \text{ ft} = 2 \text{ ohms}$$

$$V_{\text{cable}} = I_{\text{cable}} * R_{\text{cable}} = (5 \text{ amps} * 2 \text{ ohms}) = 10 \text{ volts}$$

This voltage drop reduces the voltage available at the motor from the original 24 to just 14 volts and will cause the motor torque to drop at lower speeds. The most noticeable loss of torque occurs when the motor is near the maximum power point.

Stepping Motors

Stepping Motor Systems

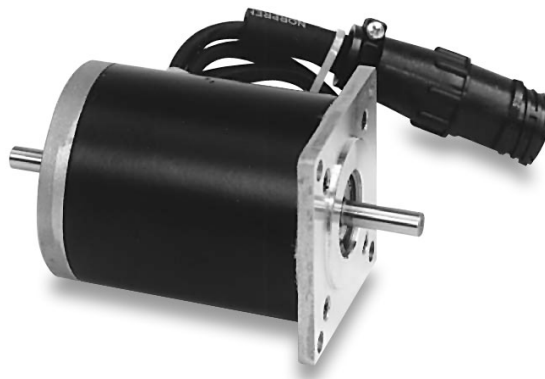
Cable Resistance Consumes Power

A second effect of cable resistance is to consume power from the drive and its power supply. Continuing with the example case, the total power loss in the cable is:

$$P_{\text{cable}} = I_{\text{cable}}^2 \times R_{\text{cable}}$$

$$P_{\text{cable}} = 5 \text{ amps}^2 \times 2 \text{ ohms}$$

$$P_{\text{cable}} = 50 \text{ watts per phase} \\ = 100 \text{ watts total cable loss}$$



If the peak motor requirement is also 100 watts, the power supply capacity must be nearly doubled to allow for the cable loss. This not only increases the cost of the system components, it will shorten the mean time between failures due to increased operating temperatures.

For the Best System Performance, Choose a Low Resistance Cable

A low resistance cable enhances the performance and reliability of most stepping motor systems. A rule of thumb that serves well in many applications is to keep the cable resistance less than or equal to the motor phase resistance. This ensures that the voltage drop across the cable and the cable power dissipation are

similar to the voltage drop and the dissipation in the motor while it is at rest. Since the stepping motor drive selected will usually have output voltage and power ratings several times greater than the motor static losses, such a cable will provide the best performance in most systems.

Stepping Motor Connector Mates

Motor Series	Function	Part Number	Source
MTR-1216, 1221, 1231 Series	Motor Power	640620-8 housing	AMP
		643075-8 cover	AMP
MTR-1220, 1235	Motor Power	206708-1 receptacle	AMP
		66101-4 contact (Qty 9)	AMP
		206966-1 clamp	AMP
MTR-1300 & MTR-1N Series	Motor Power	206708-1 receptacle	AMP
		66101-4 contact (Qty 9)	AMP
		206966-1 clamp	AMP
	Encoder	206705-2 receptacle	AMP
		66099-4 contact (Qty 9)	AMP
		206966-1 clamp	AMP
MTR-1300 Series (Splashproof Motors)	Motor Power	21000399	GE Fanuc
	Encoder	MS3116F12-10S	Bendix

Stepping Motors

MTR-Series Stepping Motors

Cable and Amplifier Compatibility Ordering Information

Part Number	Description	PowerCube Amplifier			S2K Stepping Controller	
		I/O Cable	Power Cable	Encoder Cable	Power Cable	Encoder Cable
MTR-1216-E-D-E-0	61 oz-in, NEMA 23, Encoder*	IC800PCUBCxxS	CBL-12-MP	CBL-1C-ET	n/a	CBL-1C-ET
MTR-1216-N-D-E-0	61 oz-in, NEMA 23*	IC800PCUBCxxS	CBL-12-MP	n/a	n/a	n/a
MTR-1220-E-D-E-0	116 oz-in, NEMA 23, Encoder	IC800PCUBCxxS	CBL-13-MP	CBL-1C-ET	n/a	n/a
MTR-1220-N-D-E-0	116 oz-in, NEMA 23	IC800PCUBCxxS	CBL-13-MP	n/a	n/a	n/a
MTR-1221-E-D-E-0	144 oz-in, NEMA 23, Encoder (124 oz-in with PowerCube)*	IC800PCUBCxxS	CBL-12-MP	CBL-1C-ET	CBL-12-MPS	CBL-1C-ET
MTR-1221-N-D-E-0	144 oz-in, NEMA 23 (124 oz-in with PowerCube)*	IC800PCUBCxxS	CBL-12-MP	n/a	CBL-12-MPS	n/a
MTR-1231-E-D-E-0	230 oz-in, NEMA 23, Encoder*	IC800PCUBCxxS	CBL-12-MP	CBL-1C-ET	CBL-12-MPS	CBL-1C-ET
MTR-1231-N-D-E-0	230 oz-in, NEMA 23*	IC800PCUBCxxS	CBL-12-MP	n/a	CBL-12-MPS	n/a
MTR-1235-E-D-E-0	185 oz-in, NEMA 23, Encoder	IC800PCUBCxxS	CBL-13-MP	CBL-13-ET	n/a	n/a
MTR-1235-N-D-E-0	185 oz-in, NEMA 23	IC800PCUBCxxS	CBL-13-MP	n/a	n/a	n/a
MTR-1324-E-D-E-0	335 oz-in, NEMA 34, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1324-E-D-E-S	335 oz-in, NEMA 34, Encoder, Splashproof	n/a	n/a	n/a	CBL-14-MP	CBL-14-ET
MTR-1324-N-D-E-0	335 oz-in, NEMA 34	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1324-N-D-E-S	335 oz-in, NEMA 34, Splashproof	n/a	n/a	n/a	CBL-14-MP	n/a
MTR-1331-J-E-D-E-0	327 oz-in, NEMA 34, Encoder	IC800PCUBCxxS	CBL-13-MP	CBL-13-ET	n/a	n/a
MTR-1331-J-E-D-E-S	327 oz-in, NEMA 34, Encoder, Splashproof	IC800PCUBCxxS	CBL-14-MP	CBL-14-ET	n/a	n/a
MTR-1331-J-N-D-E-0	327 oz-in, NEMA 34	IC800PCUBCxxS	CBL-13-MP	CBL-13-ET	n/a	n/a
MTR-1331-J-N-D-E-S	327 oz-in, NEMA 34, Splashproof	IC800PCUBCxxS	CBL-14-MP	CBL-14-ET	n/a	n/a
MTR-1337-E-D-E-0	675 oz-in, NEMA 34, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1337-E-D-E-S	675 oz-in, NEMA 34 Encoder, Splashproof	n/a	n/a	n/a	CBL-14-MP	CBL-14-ET
MTR-1337-N-D-E-0	675 oz-in, NEMA 34	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1337-N-D-E-S	675 oz-in, NEMA 34, Splashproof	n/a	n/a	n/a	CBL-14-MP	n/a
MTR-1350-E-A-E-0	630 oz-in, NEMA 34, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1350-E-A-E-S	630 oz-in, NEMA 34, Encoder, Splashproof	n/a	n/a	n/a	CBL-14-MP	CBL-14-ET
MTR-1350-E-D-E-0	995 oz-in, NEMA 34, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1350-E-D-E-S	995 oz-in, NEMA 34, Encoder, Splashproof	n/a	n/a	n/a	CBL-14-MP	CBL-14-ET
MTR-1350-N-A-E-0	630 oz-in, NEMA 34	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1350-N-A-E-S	630 oz-in, NEMA 34, Splashproof	n/a	n/a	n/a	CBL-14-MP	n/a
MTR-1350-N-D-E-0	995 oz-in, NEMA 34	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1350-N-D-E-S	995 oz-in, NEMA 34, Splashproof	n/a	n/a	n/a	CBL-14-MP	n/a
MTR-1N31-I-E-D-S-0	650 oz-in, NEMA 34, Encoder (605 oz-in with PowerCube)	IC800PCUBCxxS	CBL-13-MP	CBL-13-ET	CBL-13-MP	CBL-13-ET
MTR-1N31-I-N-D-S-0	650 oz-in, NEMA 34, (605 oz-in with PowerCube)	IC800PCUBCxxS	CBL-13-MP	n/a	CBL-13-MP	n/a
MTR-1N32-I-E-D-S-0	1200 oz-in, NEMA 34, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1N32-I-N-D-S-0	1200 oz-in, NEMA 34	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1N41-G-E-A-E-0	1905 oz-in, NEMA 42, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1N41-G-N-A-E-0	1905 oz-in, NEMA 42	n/a	n/a	n/a	CBL-13-MP	n/a
MTR-1N42-H-E-A-E-0	3074 oz-in, NEMA 42, Encoder	n/a	n/a	n/a	CBL-13-MP	CBL-13-ET
MTR-1N42-H-N-A-E-0	3074 oz-in, NEMA 42	n/a	n/a	n/a	CBL-13-MP	n/a

Cable Ordering Information

	Part Number	Description
Stepping Motor Power Cables	CBL-12-MP-xx*	Power Cable, MTR-1216, 1221 & 1231 Stepping Motor to PowerCube, xx = 10, 20 or 30 feet
	CBL-12-MPS-xx*	Power Cable, MTR-1216, 1221 & 1231 Stepping Motor to S2K, xx = 10, 20 or 30 feet
	CBL-13-MP-xx	Power Cable, MTR-1235, 1300 & 1N Series Stepping Motors, xx = 10, 20 or 30 feet
	CBL-14-MP-xx	Power Cable, MTR-1235, 1300 & 1N Series Splashproof Stepping Motors, xx = 10, 20 or 30 feet
Encoder Cables	CBL-1C-ET-xx	Encoder Cable, MTR-1216, 1221 & 1231 Stepping Motors, xx = 10, 20 or 30 feet
	CBL-13-ET-xx**	Encoder Cable, Flying Lead to MTR-1235, 1300 & 1N Series Stepping Motors, xx = 10, 20 or 30 feet
	CBL-14-ET-xx**	Encoder Cable, Flying Lead to MTR-1235, 1300 & 1N Series Splashproof Stepping Motors, xx = 10, 20 or 30 feet
Power Cube I/O Cables	IC800PCUBC02S0x0	Interface Cable, PowerCube Amplifier DB-15 I/O Connector to Flying Leads, 200 Steps/Rev, x = 3 or 5 m
	IC800PCUBC04S0x0	Interface Cable, PowerCube Amplifier DB-15 I/O Connector to Flying Leads, 400 Steps/Rev, x = 3 or 5 m
	IC800PCUBC10S0x0	Interface Cable, PowerCube Amplifier DB-15 I/O Connector to Flying Leads, 1000 Steps/Rev, x = 3 or 5 m

*MTR1216, 1221 an 1231 motor winding connection type (series or parallel) is determined by the motor power cable not by the winding designation (A or D) in the motor part number.

**Requires TRM-JAUX-xx break out board for encoder feedback to S2K stepping motor controller.

Stepping Motors

Stepping Motor Cube

Stepping Motor Cube: Complete, Integrated Stepping Motor and Drive

Designers of industrial stepping motor applications continually demand more features, fewer system components and less wiring. GE Fanuc raises the bar with its high-performance Stepping Motor Cube, integrating motor, drive and control communications in a single package.

The Stepping Motor Cube is available in two versions:

- Pulse Command–full/half-step amplifier only, step/direction command
- DeviceNet–microstepping amplifier (50,000 steps/rev) with on-board positioner and diagnostics

The Power of GE Fanuc and DeviceNet Technologies

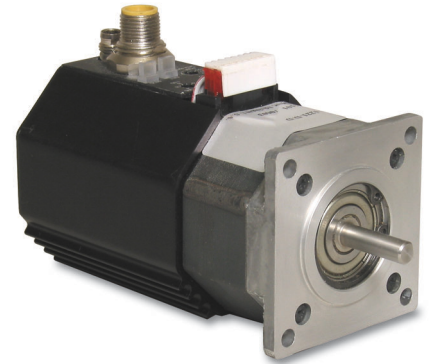
The addition of DeviceNet to the Stepping Motor Cube turns an exceptional, digital 3-Amp drive and motor into a microstepping position controller capable of communicating over the network's I/O Command and Response Message channels. Systems designed to maximize the power of GE Fanuc and DeviceNet technology can perform the following functions:

- Enable the drive and load position commands
- Load values for position, accel/decel and velocity
- Read motor position data
- Diagnose system faults for multiple axes

Specifications

Designed to perform in industrial environments, the Stepping Motor Cube features:

- Separate power supplies for Motor Cube and DeviceNet connection
- Field wiring of motor signals is not required with DeviceNet models
- Full or half-step modes for step/direction models
- 50,000 microstepping mode for DeviceNet models
- 50 kHz max pulse frequency for step/direction models
- 2 μ s minimum pulse width



Features

- Integral drive with 3-Amp, 24-48 VDC power input
- NEMA 23 stepping motor
- Three models available with torque ratings from 50 to 175 oz-in
- Optional 500 ppr Encoder on pulse command models

The latest addition to GE Fanuc's offering of leading-edge, integrated motion control products, the Stepping Motor Cube fits easily into systems where panel space is limited. And with the optional DeviceNet communications, multi-axis systems benefit from:

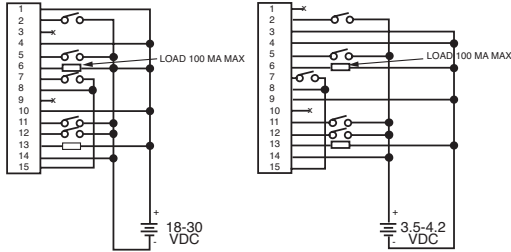
- Reduced point-to-point wiring
- Reduced components and integration
- Network positioning and diagnostics for better system performance and efficiency

Stepping Motors

Stepping Motor Cube

Connection Information - Pulse Command Models

Discrete Inputs and Outputs

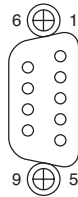


DB-15 Connector*

Pin	Function
1	Pulse + (24V)
2	Pulse -
3	Direction + (4V)
4	Input Common
5	Power Save
6	Stall Output
7	Step Size Select A
8	Step Size Common
9	Pulse + (4V)
10	Direction + (24V)
11	Direction-
12	Enable Input
13	OK Output
14	Output Common
15	Step Size Select B

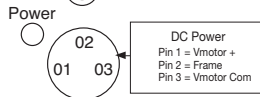
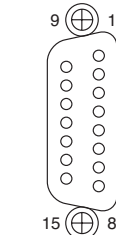
* Optional DB-15 to screw terminal adaptor (IC800CUBDB15ADP) is available

Encoder Output Option



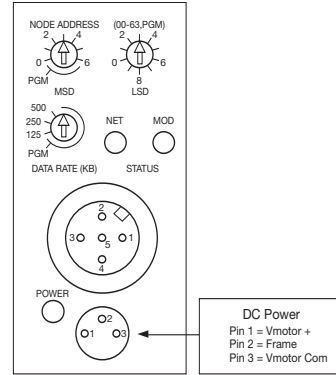
DB9 Pinout

Pin	Function
1	Channel A+
2	Channel B+
3	Index +
4	+ 5V
5	Gdn
6	Channel A-
7	Channel B-
8	Index -
9	Gnd



DC Power
Pin 1 = Vmotor +
Pin 2 = Frame
Pin 3 = Vmotor Com

Connection Information - DeviceNet Models

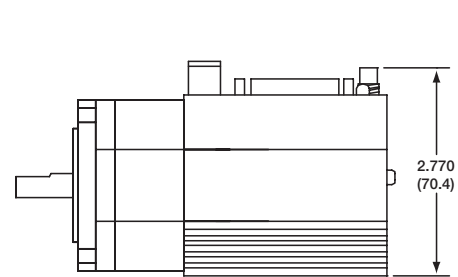
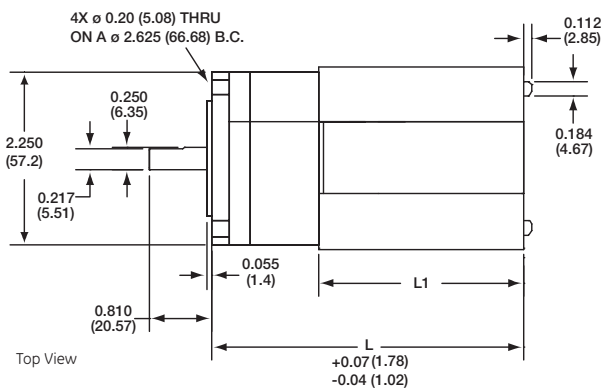


DeviceNet Connector

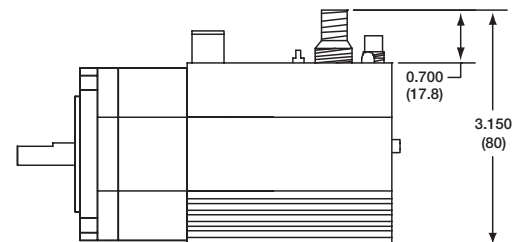
Pin (Male)	Function	Color
1	Drain	bare
2	V+	red
3	V-	black
4	CAN_H	white
5	CAN_L	blue

Micro-D Mini Mating Connector, Turck WKC 572-2M/S630

Mechanical Dimensions in (mm)



Side View-Pulse Command Configuration



Side View-DeviceNet Configuration

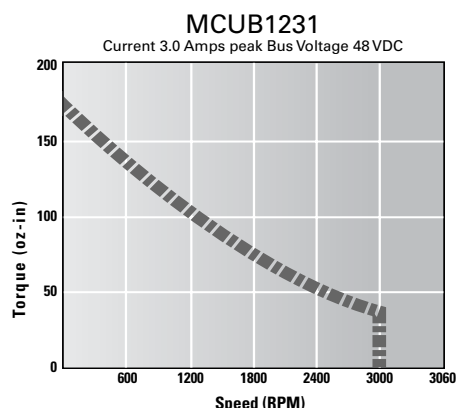
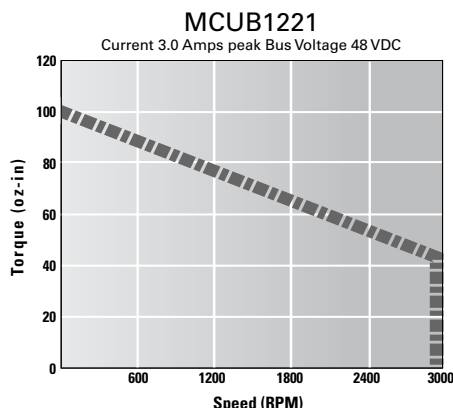
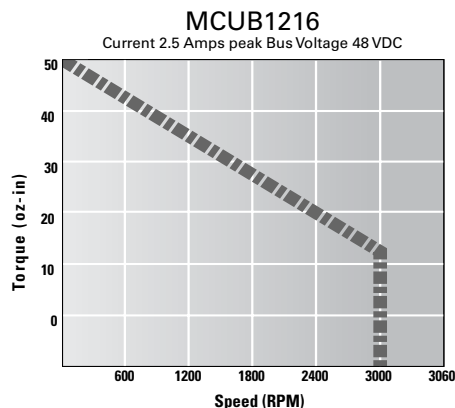
Model	LMax in (mm)	L1 in (mm)	Weight lb(kg)
IC800MCUB12160XN	3.7 (93.9)	2.7 (68.6)	1.6 (0.73)
IC800MCUB12210XN	4.2 (106.7)	2.7 (68.6)	2.1 (0.95)
IC800MCUB12310XN	5.2 (132.1)	2.7 (68.6)	3.1 (1.41)
IC800MCUB12160XD	3.7 (93.9)	2.7 (68.6)	1.6 (0.73)
IC800MCUB12210XD	4.2 (106.7)	2.7 (68.6)	2.1 (0.95)
IC800MCUB12310XD	5.2 (132.1)	2.7 (68.6)	3.1 (1.41)
IC800MCUB12160XE	4.5 (114.3)	3.5 (88.9)	1.8 (0.82)
IC800MCUB12210XE	5.0 (127.0)	3.5 (88.9)	2.3 (1.1)
IC800MCUB12310XE	6.0 (152.4)	3.5 (88.9)	3.3 (1.5)

Stepping Motors

Stepping Motor Cube

Performance Curves

The performance curves show rated torque available for 48 VDC and full stepping mode. Torque must be reduced by 30% for half-stepping mode. Lower bus voltages will also decrease the available speed and torque.



MotorCube Ordering Information

Part Number	Description
IC800MCUB12160XD	50 oz-in Stepping Motor Cube with DeviceNet
IC800MCUB12160XE	50 oz-in Stepping Motor Cube, Pulse/Direction Interface with 500 line Encoder
IC800MCUB12160XN	50 oz-in Stepping Motor Cube, Pulse/Direction Interface
IC800MCUB12210XD	100 oz-in Stepping Motor Cube DeviceNet
IC800MCUB12210XE	100 oz-in Stepping Motor Cube, Pulse/Direction Interface with 500 line Encoder
IC800MCUB12210XN	100 oz-in Stepping Motor Cube, Pulse/Direction Interface
IC800MCUB12310XD	175 oz-in Stepping Motor Cube DeviceNet
IC800MCUB12310XE	175 oz-in Stepping Motor Cube, Pulse/Direction Interface with 500 line Encoder
IC800MCUB12310XN	175 oz-in Stepping Motor Cube, Pulse/Direction Interface

Consult the factory for an application-specific Stepping Motor Cube sizing or for more information on how GE Fanuc and DeviceNet can improve the performance of your stepping motor control systems.

Cable Ordering Information

	Part Number	Description
Stepping MotorCube Power Cables	IC800MCC23P050	Power Cable, MotorCube Stepping Motor to Flying Lead, 5 m
	IC800MCC23P100	Power Cable, MotorCube Stepping Motor to Flying Lead, 10 m
Encoder Cables	CBL-12-ED-03M-RA	Encoder Cable, Stepping MotorCube DB-9 Right Angle Connector to Flying Lead, 3 m
Stepping MotorCube I/O Cables	IC800PCUBC0250x0	Interface Cable, MotorCube DB-15 I/O Connector to Flying Leads, 200 Steps/Rev, x = 3 or 5 m
	IC800PCUBC0450x0	Interface Cable, MotorCube DB-15 I/O Connector to Flying Leads, 400 Steps/Rev, x = 3 or 5 m
	IC800PCUBC1050x0	Interface Cable, MotorCube DB-15 I/O Connector to Flying Leads, 1000 Steps/Rev, x = 3 or 5 m

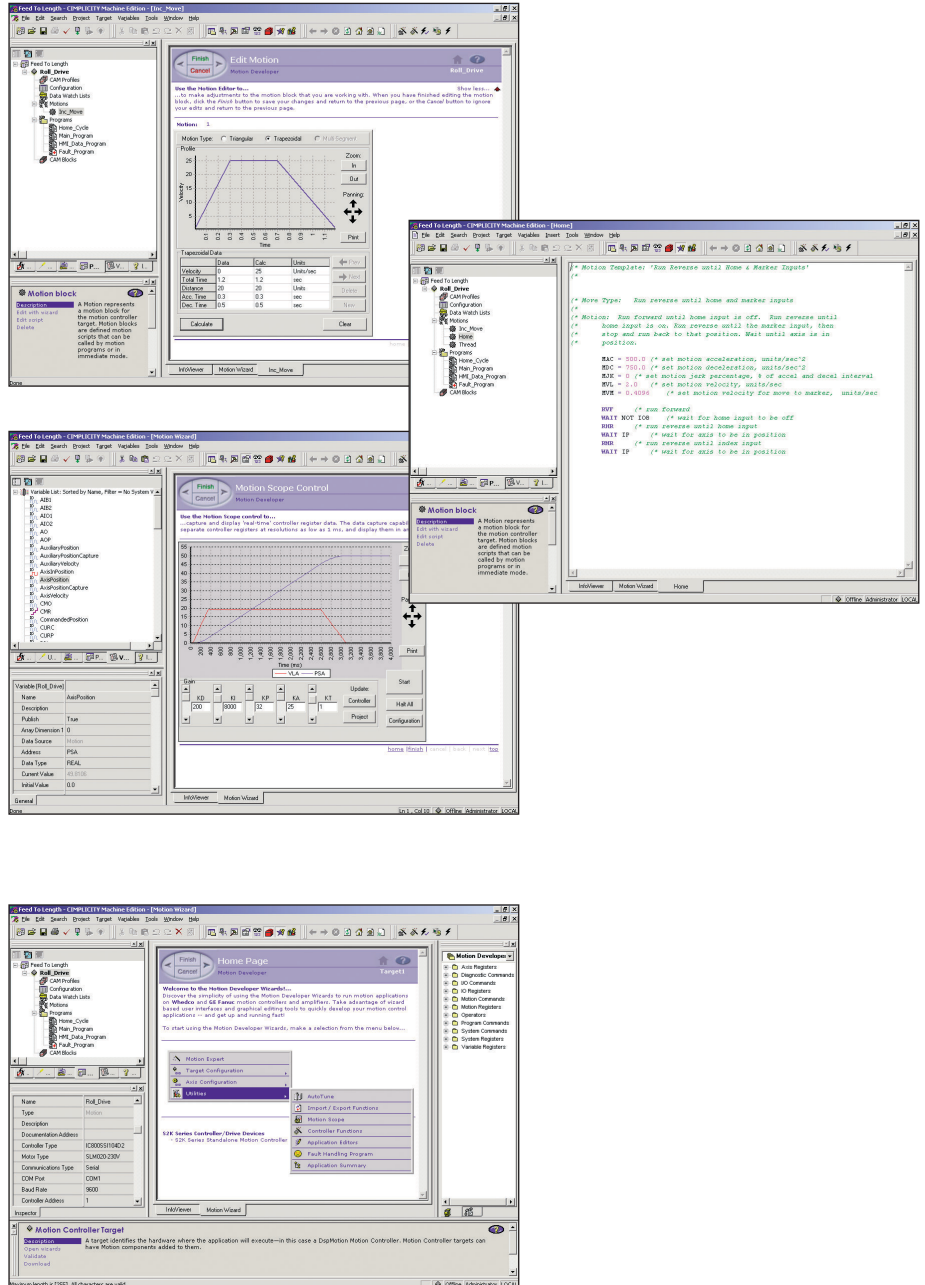
Accessory Ordering Information

	Part Number	Description
Screw Terminal Adapter	IC800CUBDB15ADP	Plug on Adapter Converts DB15 Connections to Screw Terminals (Pulse/ Direction models only)

Development Software

Motion Developer

S2K Series controllers are configured using the Motion Developer software. This easy-to-use interface provides the user with a range of programming methods appropriate for both the beginner and the more advanced programmer. Motion Developer is also a member of GE Fanuc's Proficy® Machine Edition environment which can include factory automation software applications like View and Control. Thus, a complete machine control solution is further simplified with one programming environment.



Ordering Information

Motion Developer with 1 year SAFE Gold	BC646MODEV
5-pack Motion Developer with 1 year SAFE Gold	BC646MODEV05PK
10-pack Motion Developer with 1 year SAFE Gold	BC646MODEV10PK
1 year SAFE Gold Renewal	SAG48MODEV

Motion Software

Development Software

New Application Wizard

Application Wizards provide step-by-step instructions to guide the first-time user through controller configuration and simple motion programming.

The Motion Solutions templates aid the user in rapid development of common applications such as flying cutoff, rotary knife and traverse (spool) winder.

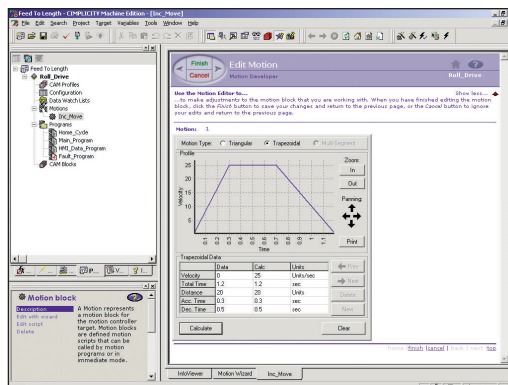
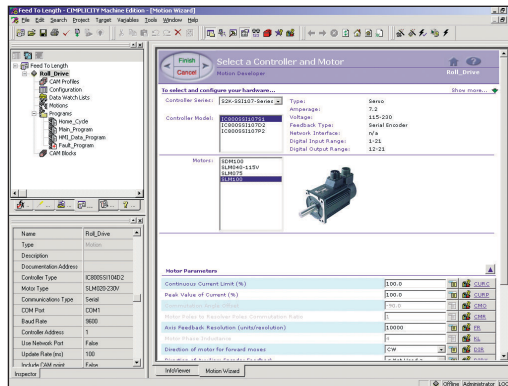
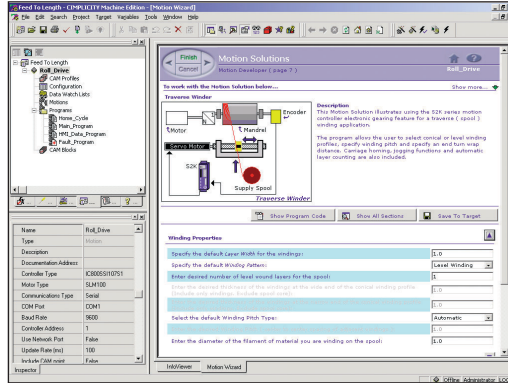
Each Motion Developer "project" stores all of the configuration, motion and program information for a complete multi-axis system. Projects can be reused or modified at any time.

Configuration Wizard

Setting up your system is simplified with drop-down motor/drive lists complete with pictures. Complete controller configurations, including communication parameters, user unit scaling, master encoder configuration, position rollover, I/O configuration and electronic gearing are configured using a simple question and answer format. The S2K "autotune" function provides a novice user with a way to get optimum performance without having in-depth knowledge of tuning parameters.

Motion Wizard

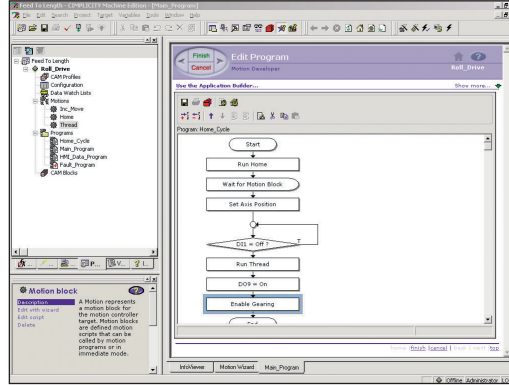
Adding new motion blocks is as easy as selecting the move type from the available list and filling in the blanks. Incremental moves can be created using the Motion Calculator. Advanced users can customize motion blocks using the text editor. Up to 100 motion blocks can be created and called by any of the four programs. Once created, these motion blocks can be saved in the Toolchest library (drawer) under a user-specified name for re-use in future projects.



Development Software

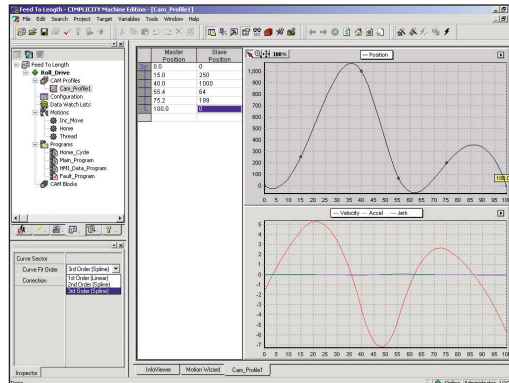
Graphical Motion Editor

The graphical motion Program Editor allows programs to be developed using a flow chart format. New commands can be inserted from the menus or drag-and-dropped from the Toolchest. Double clicking a program block allows block parameters to be changed. Program flow control is easy to create by making or breaking connections. Selecting a decision block highlights the conditional program path for easy visualization.



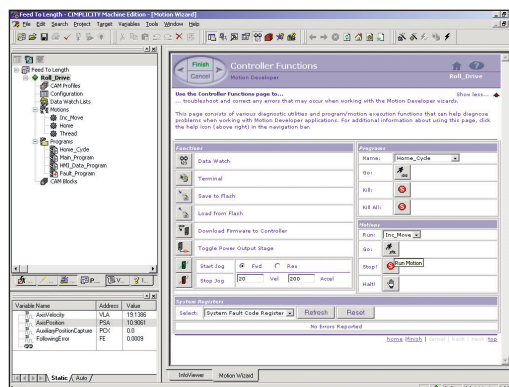
CAM Editor

Motion Developer provides a graphical CAM Profile Editor for developing electronic CAM Profiles. Data points can be imported/exported in CSV file format, manually entered into the data table or by inserting and dragging points on the graph. CAM Profiles can be subdivided into sectors with each sector supporting individual first, second or third order curve fitting. Multiple profiles can be stored in a project.



On-line Menu

Motion Developer also includes tools to aid in quick start-up and debugging. The Controller Functions screen provides the user with a convenient way to start/stop motion blocks or programs, jog the axis motor, view or reset system status and faults and open the Data Watch window or the terminal window for immediate mode communications with the selected controller.

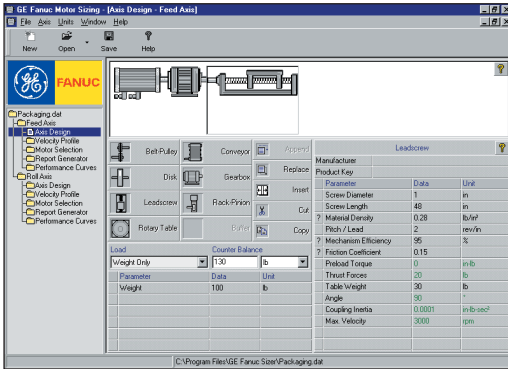


The Data Watch and Motion Scope functions allow the user to view an “o’scope-style” trend chart for selected variables. The Data Watch window allows you to monitor and change both system and user variables in real time.

Motion Software

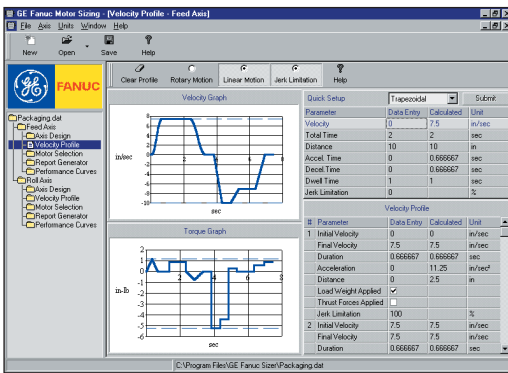
Servo Motor Sizing Software

The GE Fanuc Sizer is a powerful motor selection program to assist in the selection of GE Fanuc servo solutions for a broad range of user defined applications. GE Fanuc Sizer is one of the most advanced motor selection programs available, providing users the flexibility to quickly define and analyze many possible system configurations in order to determine the optimum solution. Advanced features include:



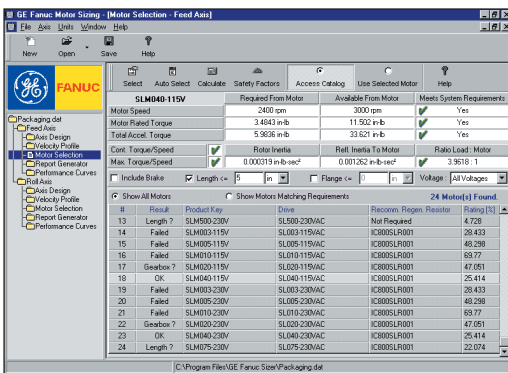
The Axis Design screen (above) is first used to define the system mechanics using graphical icons with fill-in-the-blank data tables.

- Graphical design of system mechanics and motion profiles
- Multiple axes can be analyzed and saved in one file with user defined axes names
- Flexible user defined units of measure
- Inclined loads in increments of 1 degree with user defined counterbalancing
- Graphical display of selected motor torque/speed curve with superimposed loading
- Comprehensive on-line and printed report can be exported to an MS-Word template that can be customized by the user



The Velocity Profile screen (below) is then used to define the motion profile for each axis and supports the following features:

- Quick Set-up for simple triangular or trapezoidal velocity profiles or a free form tool to define complex, multi-speed profiles
- Jerk limited or linear acceleration may be defined for each accel/decel segment
- Thrust load and application load may be defined for each motion segment allowing complex machine cycles to be quickly analyzed
- Enter or view profile data in either linear or rotary units
- Toggle jerk limiting on/off with convenient toolbar button to quickly assess impact on required peak motor torque



The Motor Selection screen (right) is used to search the database of GE Fanuc motors for the optimum solution. The selection screen includes:

- Automatic selection and ranking of viable GE Fanuc servo motor solutions
- User defined safety factors for torque margin, load/motor inertia ratio, etc.
- Regeneration resistor calculations automatically recommend GE Fanuc resistor kit part number
- User defined motor selection criteria includes voltage, motor length and diameter, brake, inertia ratio and torque safety margin

The GE Fanuc Sizer software can make short work of choosing and documenting the best GE Fanuc motor solution for your motion applications. The intuitive graphical interface makes it easy to use for a novice without sacrificing the flexibility or features demanded by more experienced users.

Global Reach with Local Presence

We reach out to our customers through a worldwide network of manufacturing, sales, distribution, service and support.



GE Fanuc Automation Information Centers

USA and the Americas:
1- 800-GE FANUC
or (434) 978-5100

Europe, Middle East and Africa:
(352) 727979-1

Asia Pacific:
86-21-3222-4555

Additional Resources

For more information, please visit the GE Fanuc web site at:

www.gefanuc.com

