

Drive features

- Power: 400W-3.5 kW three-phase 230VAC 400W-750W single-phase 230VAC capable 400W 110VAC capable
- Fully digital control with up to 1kHz velocity loop response
- Easy setup and diagnostics with Drive CM PC-based software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- Capable of both EtherCAT® and Modbus TCP control. Uses XBF-PN04B/ XBF-PN08B EtherCAT® PLC modules for EtherCAT® operation and final commissioning. For Modbus TCP operation and final commissioning, use any Modbus TCP Client (Productivity, BRX, Click, etc.).
- Command options over EtherCAT® control and Modbus TCP include:

Command Option	EtherCAT® Control	Modbus TCP Control
Position Mode (PP)	✓	✓
Homing Mode (HM)	✓	✓
Velocity Mode (PV)	✓	✓
Torque Mode (PT)	✓	✓
Cyclic Synchronous Position Mode (CSP)	✓	
Cyclic Synchronous Velocity Mode (CSV)	✓	
Cyclic Synchronous Torque Mode (CST)	✓	

- ±10V Analog Torque Limit (not torque control)
- The 1 kHz bandwidth allows for high-level automatic tuning. Several
 modes of tuning are available including Off-Line Auto Tuning (the drive
 initiates its own move commands while Auto tuning), On-Line Auto
 Tuning (an external controller sends the move commands while the
 drive Auto tunes), and Manual Tuning (all tuning values are adjusted by
 the user).
- (6) Optically isolated configurable digital inputs and (3) user configurable outputs, (1) torque limit analog input. Two configurable analog outputs for monitoring various servo parameters (actual speed, torque, current, position, etc.)
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.







 Future proof your system - use Modbus TCP now and convert to EtherCAT® control in the future.

Motor features

- · Low and Medium inertia motors available:
 - Low: 100W, 200W, 400W, 750W, 1kW, and 1.5 kW; @5000rpm
 - Medium: 1.6 kW, 2.2 kW, and 3.5 kW; @3000rpm
- Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style couplings
- Integrated multi-turn absolute encoder with 19-bit resolution (524,288 pulses per revolution)
- Optional 24 VDC spring-set holding brakes (AMK2 and DMK2 motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for FBL/FCL brake motors)
- Motor cables available in standard or flex-rated lengths of 3, 5, 10, and 20m
- Standard 20-pin DIN-rail mounted break-out kit for the drive's CN1 connector (with screw terminal connections), or 20-pin cables with flying leads

Note: These parts available for sale to North American locations only.

Tuning Technology

The iX7NH drive closes the loop on current, velocity, and position (depending on control mode selection). The 1kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and four (4) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can tune motors up to 20:1 inertia mismatch.

There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor.

The drive has several tuning methods available:

- Online Auto Tuning—the drive can either tune the load live while an external controller moves the load to different positions or using the drive's internal tuning motion profile.
- Offline Auto Tuning—the drive tunes the load using the drive's internal tuning motion profile.
- Manual Tuning—all parameters are available to give power users the ultimate flexibility to tune their systems.

Control Modes

When connected to an EtherCAT® Master, the iX7NH drive can run in Cyclic Synchronous Modes (Position, Velocity, Torque) where the Master controller sends an updated setpoint every EtherCAT® cycle (~1millisecond). In these modes, the upper controller plans the motion path.

The drive can also work in Profile Modes (Position, Velocity, Torque) where the Master Controller sends one setpoint for each move. In these cases, the drive's accel, decel, and max speed settings determine the motion path planning. The drive also has 21 different homing modes to accommodate most applications.

When connected to a Modbus TCP client, the drive can operate in Profile Modes (Position, Velocity, and Torque) and in Homing Mode. Because Modbus TCP is not deterministic, servos controlled by ModTCP typically aren't operated in Cyclic Synchronous modes.

Optional Holding Brake

Each servo motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

LS Electric MSS Series In-Line Planetary Precision Gearboxes for Servo Motors

Need more torque from the motor? Have an inertia balancing issue in your design? The LS Electric MSS series gearboxes easily mate to FBL/FCL/FE/FF motors. Everything you need for mounting is included!

- Three gear ratios available (5:1, 10:1, 20:1)
- Mounting hardware included for attaching to FBL/FCL/FE/FF motors.
- Industry-standard mounting dimensions
- Thread-in mounting style
- Very low backlash: 7 arc-min single stage (5:1 and 10:1 ratios), 9 arc-min two-stage (20:1 ratios*).
- 1-year warranty



Servo drive overview

LED Display

Analog Connector

DC Bus Charge LED

The 5-digit display is used to indicate servo status and alarm

4-pin analog monitoring connector (two +/- 10V CON-F and L7P-CON-G for

Visual indication of the drive's DC bus voltage level. Do not work on the drive until the Charge LED is

2 Rotary DIPswitch

analog outputs). See L7Poptional connectors.

Sets EtherCAT® Node ID from 0 to 97. Setting to 99 enables Modbus TCP with built-in webserver, while setting to 98 enables Modbus TCP w/o webserver.*

Status LED

Indicates current state of EtherCAT® communication.

Motor Power Terminal

Incoming single or three phase 200-230 VAC (-15% to+10%, 50/60Hz)

DC Reactor **Connectors**

Regenerative **Resistor Terminal**

Connection for optional external braking resistor

Control Power Terminal

Incoming single phase 200-230 VAC (-15% to +10%, 50/60Hz)

Motor Output Terminal

Output power to the servo motor. LS motor power cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Model Number

* Node 98 functionality available in firmware 1.15 and above.

USB Connector

Used by Drive CM software for servo configuration. Connect with a standard USB A to USB mini-B cable (SV2-PGM-USB15, MOSAIC-CSU, or similar). Use USB OTG adapter cable (USB A Female to Mini USB B) if needed)

Firmware Upgrade: Use Drive CM software or attach a USB thumb drive with the new FW and update using USB On the Go (no PC required). See the UM for details.

EtherCAT® Com Ports

(ECAT IN, ECAT OUT). Use ECAT IN port (only) if using Modbus TCP.

Safe Torque Off Connector (STO)

Input/Output Connector (I/O)

20-pin CN1 connector for drive I/O. Signals include high speed pulse inputs, 6 digital inputs, 3 digital outputs, 1 analog input (torque limit), and scalable encoder output.

Encoder Connector

14-pin CN2 connector for the motor encoder. LS Encoder cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Clearly displayed on bottom of drive face for easy identification.

The LS Electric iX7NH servo drives are fully digital and include over 300 parameters to configure the drive for almost any application. For convenience, the parameters are grouped into several categories including:

- · Basic parameters
- · Gain parameters
- I/O parameters
- · Velocity parameters
- Misc. parameters
- Monitor parameters

All parameters have commonly used default values which allow you to operate the iX7NH drive "out-of-the-box". The drive auto-detects the LS servo motor (through the serial encoder) and sets up the default gains and limits based on the connected motor.

The drive can still be easily configured to your specific application, however. The Drive CM configuration software has a built-in Setup Wizard that will guide you through all the basic setup parameters. The Setup Wizard will quickly and easily get your application started – from setting up the I/O to determining the appropriate homing sequence. When using ModTCP (Node 99) drive configuration can also be accomplished via a built-in webserver. This function can be disabled by setting Node ID to 98*.

Using XGB XBF-PN04B or XBF-PN08B EtherCAT® motion modules, you can also configure your drive from the XG5000 interface. See the Interactive PLC Guide for videos on how to commission and program the PLC/servo system.

After configuration is complete, the Auto Tune features of the drive will get your application tuned for optimal responsiveness and performance.



How to select and apply iX7NH systems

The primary purpose of the AC servo system is to precisely control the motion of the load. The most fundamental considerations in selecting the servo system are "reflected" load inertia, servo system maximum speed requirement, servo system continuous torque requirement, and servo system peak torque requirement. In a retrofit application, select the largest torque servo system that most closely matches these parameters for the system being replaced. In a new application, these parameters should be determined through calculation and/or

Servo Mechanical Transmission Load

measurement. The Drive CM software has the ability to measure the load (reflected) inertia and accurately measure the motor torque output.

AutomationDirect has teamed with Copperhill Technologies to provide free servo-sizing software. "VisualSizer-SureServo" software will assist in determining the correct motor and drive for your application by calculating the reflected load inertia and required speed and torque based on the load configuration. "VisualSizer-SureServo" software can be downloaded from https://support.automationdirect.com/products/lselectric.html.

1. "Reflected" load inertia

The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the motor driveshaft. The ratio of "reflected" load inertia to motor inertia needs to be carefully considered when selecting the servo system.

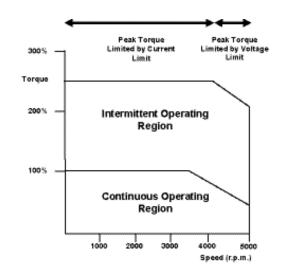
In general, applications that need high response or bandwidth

will benefit from keeping the ratio of load inertia to motor inertia as low as possible and ideally under 10:1. iX7NH Auto Tuning will still tune a system with very high response, up to 20:1 inertia mismatch. Higher system ratios can be implemented, but corresponding lower bandwidth or responsiveness must be accepted. The servo response including the attached load inertia is determined by the servo tuning. The iX7NH servo systems may be tuned automatically by the software/drive or manually by the user.

2. Torque and speed

With knowledge of the motion profile and any mechanical transmission between the motor and load, calculations can be made to determine the required servo motor continuous torque, peak torque, and maximum motor speed. The required amount of continuous torque must fall inside the continuous operating region of the system torque-speed curve (you can check the continuous torque at the average speed of the motion profile). The required amount of peak torque must also fall within the servo system's intermittent operating region of the system torque-speed curve (you need to check this value at the required maximum speed or torque). If you have an iX7NH system, these values are easily captured and recorded with the Scope feature built into the Drive CM software. If you are designing the system from scratch, use VisualSizer to define the system and calculate expected inertia and required power.

Compare the application's Continuous and Intermittent torque requirements to the torque-speed curves found in Chapter 11.3 of the iX7NH User Manual or in the system torque charts found on "iX7NH AC servo drive, motor, and cable combinations" on page tMNC-199.





Application tip - coupling considerations

The LS Electric FBL/FCL motors have keyed shafts that can be used with keyed couplings or with clamp-on or compression style couplings. For standard keyed couplings, the servo key must be "fitted" into the keyway for optimum performance and longevity. Some minor filing and pressing of the key may be required. "Servo-grade" clamp-on or compression style couplings

are usually the best choice when you consider stiffness, torque rating, and inertia. Higher stiffness (lb-in/radian) is needed for better response but there is a trade-off between stiffness and the added inertia of the coupling. Concerning the torque rating of the coupling, use a safety factor of 1.25 over the servo's **peak** torque requirement of your application.

Click here for Available Couplings

Mechanical transmissions

Common mechanical transmissions include leadscrews, rack & pinion mechanisms, conveyors, gears, and timing belts. The use of leadscrew, rack & pinion, or conveyor are common ways to translate the rotary motion of the servo motor into linear motion of the load. Matched gearboxes are available from LS Electric that will work with the LS servo motors. Each gearbox is selected to accept the 300% maximum available torque that could be generated by the motor. Gearboxes are available in 5:1, 10:1, and 20:1 ratios. The use of a speed reducer such as a gearbox or timing belt can be very beneficial as follows:

1. Reduction of reflected load inertia

As a general rule, keep the reflected load inertia as low as possible while using the full range of servo speed. The LS Electric motors can rotate at a rated speed of 2000 or 3000 rpm (rated torque at rated speed). Their max speed (slightly less available torque) is 3000 or 5000 rpm. See the speed-torque curves for more information.

Example: A gearbox reduces the motor's required torque by a factor of the gear ratio, and reduces the reflected load inertia by a factor of the gear ratio squared. A 10:1 gearbox reduces output speed to 1/10, increases output torque 10 times, and decreases reflected inertia to 1/100.

However, when investigating the effect of different speed reduction ratios DO NOT forget to include the added inertia of couplings, gearbox, or timing belt pulleys. These added inertias can be significant, and can negate any inertia reduction due to the speed reduction.

Here is a link to our <u>Timing Belts and</u> <u>Pulleys</u>

2. Low speed and high torque applications

If the application requires low speed and high torque then it is common to introduce a speed reducer so that the servo system can operate over more of the available speed range. This could also have the added benefit of reducing the servo motor torque requirement which could allow you to use a smaller and lower cost servo system. Additional benefits are also possible with reduction in reflected inertia, increased number of motor encoder counts at the load, and increased ability to reject load disturbances due to mechanical advantage of the speed reducer.

3. Space limitations and motor orientation

LS Electric servo motors can be mounted in any orientation, but the shaft seal should not be immersed in oil (open-frame gearbox, etc.). Reducers can possibly allow the use of a smaller motor or allow the motor to be repositioned.



Motor	Brake Motor	LS Electric MSS Planetary In-Line Gearboxes			
INIOLOI	DI AKE INULUI	5:1 Gearbox	10:1 Gearbox	20:1 Gearbox	
APMC-FBL01AMK-AD	APMC-FBL01AMK2-AD				
APMC-FBL02AMK-AD	APMC-FBL02AMK2-AD	96200004	96200005	<u>96200103</u>	
APMC-FBL04AMK-AD	APMC-FBL04AMK2-AD				
APMC-FCL08AMK-AD	APMC-FCL08AMK2-AD	06200007	06200000	06200257	
APMC-FCL10AMK-AD	APMC-FCL10AMK2-AD	96200007	<u>96200008</u>	96200257	
APM-FE15AMK-AD	APM-FE15AMK2-AD	96200373	96200378	96200393	
APM-FE16DMK-AD	APM-FE16DMK2-AD	96200459	96200464	96200479	
APM-FE22DMK-AD	APM-FE22DMK2-AD	96200010	96200011	96200445	
APM-FF35DMK-AD	APM-FF35DMK2-AD	96200013	96200014	<u>96200701</u>	

Ordering Guide

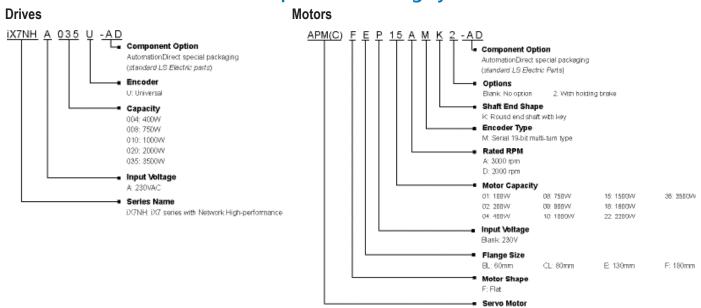
The following pages are your ordering guide for LS Electric iX7NH servo systems. Each system has a torque-speed curve included for reference. This is the fundamental information that you need to select the servo motor and matching drive for your application.

Each system needs:

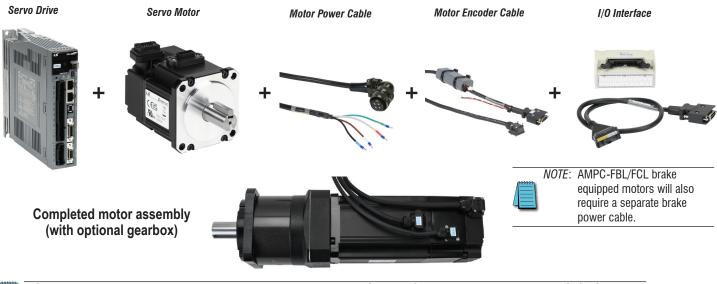
- Drive and Motor
- Motor Power Cable
- Motor Encoder Cable
- I/O connections (either a 20-pin CN1 cable+terminals kit or a 20-pin flying lead cable (user provides terminal blocks))
- FBL/FCL brake motors require a brake cable. FE/FF brake motors have brake wiring included in the power cable.
- STO cable (APCS-STOxxA-AD) or STO bypass plug (APCS-CN6K-AD). An STO bypass plug is included with each drive.



iX7NH series drives and motors part numbering system



Example of what you will need to build a complete servo system:



NOTE: Required programming software (free download). Use a standard USB-A to USB mini-B cable for connectivity (SV2-PGM-USB15, MOSAIC-CSU, or equivalent)



NOTE: If you need a gear box for your configuration, reference the gearbox chart on the previous page. Ratios of 5:1, 10:1, and 20:1 are available for each motor.





LSELECTRIC iX7NH Series Servo Systems

Torque to iX7NH System Quick Reference

Input Voltage	System Rated Torque (N·m)	System Maximum Torque (N·m)	Suggested Servo Motor	Required Servo Drive	
	0.32	0.96	APMC-FBL01AMK-AD		
	0.02	0.50	APMC-FBL01AMK2-AD		
120/230 VAC	0.64	1.91	APMC-FBL02AMK-AD	IX7NHA004U-AD	
120/230 VAC	0.04	1.91	APMC-FBL02AMK2-AD	IX/WHA0040-AD	
	1.27	3.82	APMC-FBL04AMK-AD		
	1.27	3.82	APMC-FBL04AMK2-AD		
	2.39	7.16	APMC-FCL08AMK-AD	IV7NI IA OOGI I A D	
			APMC-FCL08AMK2-AD	IX7NHA008U-AD	
	3.10	9.55	APMC-FCL10AMK-AD	IVZNILIA O4 OLL A D	
			APMC-FCL10AMK2-AD	IX7NHA010U-AD	
	4.77	14.32	APM-FE15AMK-AD		
230VAC			APM-FE15AMK2-AD	17711140001140	
230VAC	7.63	22.92	APM-FE16DMK-AD	IX7NHA020U-AD	
	7.03	22.92	APM-FE16DMK2-AD		
	40.5	24.54	APM-FE22DMK-AD		
	10.5	31.51	APM-FE22DMK2-AD	177411140051140	
	40.7	50.4	APM-FF35DMK-AD	IX7NHA035U-AD	
	16.7	50.1	APM-FF35DMK2-AD		
For information on	using single-phase supply, pleas	e see "Drive Adjustments for Single-	phase Usage" on page tMNC-203		

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Motion Control



iX7NH AC servo drive, motor, and cable combinations

xx = Cable length in meters
BN/EN/PN = Standard cable (not continuous flex)
BF/EF/PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

230V FBL/FCL Motor Systems

Тур	e System Torque Chart	iX7NH Drive	APM/APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout															
stem	Thrope (Flag)		APMC-FBL01AMK-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	n/a																
nertia Sv.		IX7NHA004U-	THE WILL THE STANFALL THE STANF	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	11/4																
100W I ow Inertia System	to Pales Cardy	<u>AD</u>	APMC-FBL01AMK2-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD																
100	\$ PER PER		THE TOTAL PROPERTY OF THE PROP	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD																
u.	Theres (State)			APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD																	
rtia Syste		IX7NHA004U-	APMC-FBL02AMK-AD	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	n/a																
200W Low Inertia System		AD		APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD																
2000	the think the time the		APMC-FBL02AMK2-AD	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	APCS-L7NCN1Txx-AD															
		1					or															
tem	Thropo (Elas)	IX7NHA004U- AD				APMC-FBL04AMK-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	n/a	APCS-CN10xA-AD												
ertia Sv																<u>AD</u>	IX7NHA004U- AD		APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	1774	
400W Low Inertia System	0.00 Continue Que ding																	ADMO EDI OZAMIZO AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	
400	disease hearth		APMC-FBL04AMK2-AD	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD																
tem	Terpo (f.m)		APMC-FCL08AMK-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	n/a																
ertia Svs	IX7NHA008U-	I WO I GLOUNWIN AD	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	1 1/ CI																	
750W Low Inertia System	1,60 College Caroling	AD	APMC-FCL08AMK2-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD																
7501	i nin ain ain ain ain ail. Iperi PPU	Specifical		APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD																



ELECTRIC iX7NH Series Servo Systems

iX7NH AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

Туре	System Torque Chart	iX7NH Drive	APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout
System	Thropo (Lui)		APMC-FCL10AMK-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	- n/a	
nertia Sys	-	IX7NHA010U-		APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD		APCS-L7NCN1Txx- AD
W Low Inertia	AD*	APMC-FCL10AMK2-AD	APCS-PNxxxLSX-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	or APCS-CN10xA-AD	
1.0k	ipori (FFI)		APMIC-PGL TUAMINZ-AD	APCS-PFxxxLSX-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	

^{*} Note - For 1kW drive single-phase supply, derate motor max torque to 200%, or upsize the drive to iX7NHA020U-AD for the torque curves in the graph.

230V FE Motor Systems

Туре	System Torque Chart	iX7NH Drive	APM/APMC Motor	Power Cable**	Encoder Cable	I/O Cable and Breakout	
stem	Thropo (Flas)		ADM FEAFAMIC AD	APCS-PNxxHSX1-AD	APCS-ENxxxDS1-AD		
ertia Sy:		IX7NHA020U-	APM-FE15AMK-AD	APCS-PFxxHSX1-AD	APCS-EFxxxDS1-AD		
1.5 kW Low Inertia System	Li September Specific	<u>AD</u> ***	ADM FF4EAMV2 AD	APCS-PNxxNBX1-AD	APCS-ENxxxDS1-AD		
1.5 K	designal.		APM-FE15AMK2-AD	APCS-PFxxNBX1-AD	APCS-EFxxxDS1-AD		
ystem	Tropo (Sa)		APM-FE16DMK-AD	APCS-PNxxHSX-AD	APCS-ENxxxDS1-AD		
Inertia S		<u>IX7NHA020U-</u> <u>AD***</u>		AFIVI-FE TODIVIN-AD	APCS-PFxxHSX-AD	APCS-EFxxxDS1-AD	APCS-L7NCN1Txx-AD
1.6 kW Medium Inertia System	**************************************			APCS-PNxxNBX-AD	APCS-ENxxxDS1-AD	or APCS-CN10xA-AD	
1.6 KW	* ***** **** ***** *******************			APCS-PFxxNBX-AD	APCS-EFxxxDS1-AD		
					I		
ystem	Torque (FLas)		APM-FE22DMK-AD	APCS-PNxxHSX-AD	APCS-ENxxxDS1-AD		
Inertia S		<u>IX7NHA020U-</u>	APW-FEZZUWR-AU	APCS-PFxxHSX-AD	APCS-EFxxxDS1-AD		
2.2 kW Medium Inertia System	7/2	<u>AD</u> ***		APCS-PNxxNBX-AD	APCS-ENxxxDS1-AD		
2.2 KW			APM-FE22DMK2-AD	APCS-PFxxNBX-AD	APCS-EFxxxDS1-AD		

** Note - Power cables with "B" in the part number are combination power/brake cables, providing power for both the motor and the brake. A brake cable is not required. *** Note - For single-phase supply, upsize the drive to iX7NHA035U-AD (2.2 kW motor max torque limited to 150%, 1.5/1.6 kW motors limited to 200% max motor torque).



ILECTRIC iX7NH Series Servo Systems

iX7NH AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) AMK2/DMK2 motors = mechanical holding brake BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake

230V FF Motor Systems

Туре	System Torque Chart	iX7NH Drive	APM/APMC Motor	Power Cable*	Encoder Cable	I/O Cable and Breakout
System	Theyen (Flas)		APM-FF35DMK-AD APM-FF35DMK2-AD	APCS-PNxxISX-AD	APCS-ENxxxDS1-AD	APCS-L7NCN1Txx-AD
				APCS-PFxxISX-AD	APCS-EFxxxDS1-AD	
kW Medium Inertia	Contractively	IX/INFIAU35U-AD		APCS-PNxxPBX-AD	APCS-ENxxxDS1-AD	or APCS-CN10xA-AD
3.5 KW	designal , see me see			APCS-PFxxPBX-AD	APCS-EFxxxDS1-AD	
		1				

*Note - Power cables with "B" in the part number are combination power/brake cables, providing power for both the motor and the brake. A brake cable is not required.



i7XNH Servo drive specifications

	i7XNH Servo Drive Specifications							
Model		IX7NHA004U-AD	IX7NHA008U-AD	IX7NHA010U-AD	IX7NHA020U-AD	IX7NHA035U-AD		
	Price	\$495.00	\$610.00	\$620.00	\$835.00	\$850.00		
	Drawing	<u>PDF</u>	PDF	PDF	PDF	PDF		
ler	Input Power	One phase 100–120 VAC One phase 200–240 VAC	One phase 200–240 VAC	Three phase	200–230 VAC (-15 to +10%	o), 50–60Hz**		
		Three phase 200-230 VAC	(-15 to +10%), 50–60Hz**			1		
Power	Rated Current [Amps]	3.0	5.2	6.75	13.5	16.0		
	Peak Current [Amps]	10.5	18.2	20.25	40.5	48.0		
	Inrush Current	TE	BD	TE	BD	TBD		
	Encoder Type	Tamagav	Quadrature (Increme va Serial (Absolute, Incremen	ntal), BiSS-B, BiSS-C (Abso tal), EnDat 2.2, Sinusoidal, A		nasonic		
	Encoder Decimation Output	Differe	ential Line Drive 3 channels A	O, /AO, BO, /BO, ZO, /ZO u	to 6.5 Mpps on 4x interpol	ation		
93	Speed Control Range			Maximum 1:5000				
тап	Frequency Response		Maximum	1 1kHz (for a 19-bit serial en	coder)			
Control Performance	Speed Variation Ratio	± 0.01 %	or lower (when load changes	between 0 and 100%), ± 0.	1 % or lower (temperature 2	5±10°C)		
rol P	Accel/Decel Time		Straight line acceleration/dec	celeration (0-10,000 ms) and	d/or S-curve (0-1000 ms)			
Cont	Torque Control Repetition Accuracy	+ 1% or iass						
	Recommended Breaker (UL 489)	15A (max)			30A (max)			
	Recommended Fuse***	15A (max)			30A	30A (max)		
	SCCR Rating***	5kA						
	Communication Standard	FoE (Firmware download), EoE (parameter setting by UDP, Tuning, Secondary function, Parameter copy) CoE (IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile)						
ation	Physical Layer		1	00BASE-TX (IEEE802.3)				
cific	Connector			RJ45 x 2				
Spe	Communication Distance		Distance	ce between nodes 100m or	ess			
EtherCAT® Specification	DC (Distributed Clock)		Synchronization by DC (D	istributed Clock) mode. Min	imum DC cycle: 125µs			
therC	LED Display		L/A0 & L/A1 (Link	Activity) LED for EtherCAT	In & Out status			
Ü	CiA 402 Drive Profile	Profile Position Mode, Profi	le Velocity Mode, Profile Torq Cyclic Syncl	ue Mode, Cyclic Synchronor nronous Torque Mode, Hom		nchronous Velocity Mode,		
Digital I/0 Specifications	Digital Input	(*POT, *NOT, *HOM		2–24 VDC, total 6 input char selectable functions for ass P_CL, N_CL, PROBE1, PRO	ignment.	N, LVSF1, LVSF2)		
Digita Specifi	Digital Output	(*BR	Service rating: 24VDC ± 10%, 120mA, 3 output channels are configurable 11 different selectable functions for assignment (*BRAKE, *ALARM, *READY, ZSPD, INPOS, TLMT, VLMT, INPOS2, INSPD, WARN, TGON)					
Analog I/O	Analog Input			nput voltage range: ±10V torque limit (1 channel, not	configurable)			
An I	Analog Output	12-bit resolution	, ±10V output range, total 2 c	hannels (configurable): able	to selectively configure 25	types of output		
			Continued on next p	page				

^{*} Basic allocation signal.

^{**} See Single-phase power input section on the following page for single phase considerations.
*** Use class CC or High Speed J (JHL series) current limiting fuses to prevent nuisance tripping and to increase panel SCCR rating.



i7XNH Servo drive specifications, continued

	i7XNH Servo Drive Specifications, continued						
	Continued from previous page						
	Model	All iX7NH Series Drives					
	Safety Function	2 Input Channels (STO1 and STO2), 1 Output Channel (EDM)					
ation	Function	Firmware download, tuning, test drive, monitoring, parameter duplication					
USB Communication	Communication Standard	Complies with USB 2.0 Full Speed and OTG 2.0 standards.					
Com	Accessible Device	PC or USB storage device					
	Dynamic Braking	Standard built-in brake (activated when the servo alarm goes off or when the servo is off)					
uo	Regenerative Braking	Built-in by default					
uncti	Display Function	7-segment display (5 digits)					
Internal Function	Self-setting Function	Drive node address setting is possible using two rotary switches					
Inter	Additional Function	Gain tuning, alarm history, jog operation, home searching					
	Protection Function	Overcurrent, overload, overheat, overvoltage, insufficient voltage, overspeed, abnormal state of encoder, position following error, current detecting error					
ent	Operating Temperature	0–50 °C [32–122 °F]					
Operation Environment	Storage Temperature	-20–65 °C [-4–149 °F]					
n Envi	Operating Humidity	Under 80% relative humidity					
eratio	Storage Humidity	Under 90% relative humidity (non-condensing)					
ď	Environment	Keep indoors, avoid corrosive/flammable gas or liquid					
	<i>Approvals</i>	_C UL _{US} (E479434), CE, UKCA, KC					

Single-phase Power Input

Although designed with 3-phase AC input power in mind, some iX7NH systems are capable of supporting single-phase AC input power. With three phase AC supply, the iX7NH motor/drive combination supplies 300% rated maximum motor torque (see the instantaneous Operation Range in the torque-speed charts on previous pages). With single phase AC supply some ratings will have limited maximum/intermittent motor torque, and/or the next larger drive size will be required.

Drive Derating for Single-phase Usage					
3-phase Motor Rating Drive to use with Single- phase Input		Motor Torque Derating for Single-phase Input			
100W/200W/400W	iX7NHA004U-AD (400W)	No upsizing/derating required. Single phase and three phase input both produce 300% max torque			
750W	iX7NHA008U-AD (1kW)	No upsizing/derating required. Single phase and three phase input both produce 300% max torque			
1kW	iX7NHA010U-AD (1kW) or iX7NHA020U-AD (2kW)	2kW drive produces 300% max torque. The 1kW drive can be used, but the motor can only provide 200% max torque.			
1.5 kW/1.6 kW	iX7NHA035U-AD (3.5 kW)	With single phase supply, this drive only produces 150% max motor torque with a 2.2 kW motor. 3.5kW drive produces 200%			
2.2 kW	IXTIVI IAUUUU-AD (3.3 KVV)	max torque with 1.5 kW and 1.6 kW motors.			
3.5 kW n/a		No single phase capability			

www.automationdirect.com Motion Control

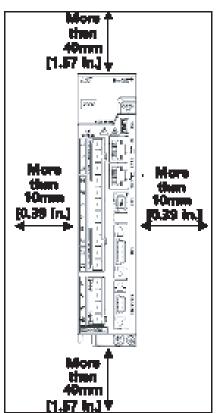


ELECTRIC iX7NH Series Servo Systems

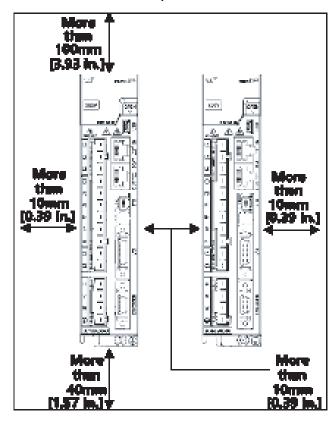
iX7NH Drive Standard Installation

iX7NH Drive Installation Spacing

Single Drive



Multiple Drives



iX7NH Drive Installation Concerns:

- Install external regenerative resistors so that any heat generated does not affect the drive.
- · Vertical installation only. For proper heat dissipation, ensure the back of the drive makes good contact with the subpanel.
- Protect the drive from metal chips and other falling debris during control panel assembly.
- Make sure that oil, water, or metal dust do not enter the drive.
- Protect the control panel by using an air purge system when installing it in any area where there are harmful gases or dust.

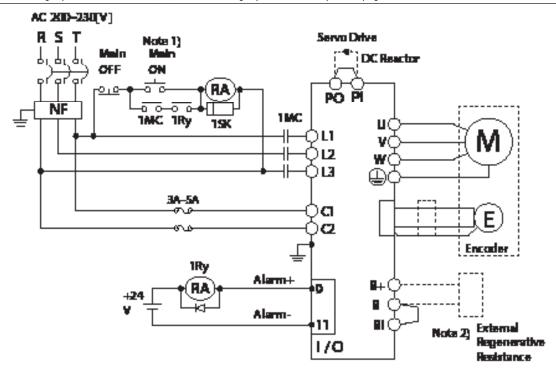


iX7NH Drive Wiring

iX7NH Power Supply Wiring



NOTE: Single-phase can use 2 of R, S, or T. See "Single-phase Power Input" on page tMNC-203 for more information.





NOTE 1: About 2.5–3 seconds are required from main power supply to alarm signal output. Hold the main power on for 3 seconds until the alarm circuit ("1Ry") will latch main power ON.



NOTES 2 & 3: Remove the jumper for the internal resistor between B and BI, and connect the external resistor to the B+ and B pins. If an external regen resistor is required, see the available regen resistors under the Motion Control category at AutomationDirect.com (APCS-140R50-AD, APCS-300R30-AD, etc.).

LSELECTRIC L7C AC Servo Systems

Drive features

- Power: 100W-1kW single-phase 220VAC
- Fully digital with up to 1kHz velocity loop response
- Easy setup and diagnostics with built-in keypad/display or the DriveCM PC-based software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- · Command options include:
- ± 10V torque or velocity command
- Pulse train or master encoder position command (accepts line driver or open collector) with real-time selectable electronic gearing
- Internal Indexer for position/speed-based moves. 64 individual move statements can be configured in the drive. Each Index contains its own distance, speed, accel, decel, and dwell parameters. These indexes can be set up through DriveCM software or modified in realtime with serial communication (PLC, HMI, etc.). The indexes can be initiated via Digital Inputs or through serial comms.
- The 1 kHz bandwidth allows for high-level automatic tuning. Several
 modes of tuning are available including Off-Line Auto Tuning (the drive
 initiates its own move commands while Auto tuning), On-Line Auto
 Tuning (an external controller sends the move commands while the
 drive Auto tunes), and Manual Tuning (all tuning values are adjusted by
 the user).
- Optically isolated digital inputs (10) and (5) general purpose (user-configurable) outputs + (3) outputs permanently configured as alarm/status binary code, analog inputs for speed and torque control (2), and line driver output for encoder (with scalable resolution).
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.







Motor features

- · Low inertia models:
 - 100W, 200W, 400W, 750W and 1kW
 - Speeds up to 5,000 rpm
- Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style couplings
- Integrated encoder with 17-bit resolution (131,072 pulses per revolution)
- Optional 24 VDC spring-set holding brakes (AYK2 motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for brake motors)
- Motor cables available in standard or flex-rated lengths of 3, 5, 10, and 20m
- Standard 50-pin DIN-rail mounted break-out kit for the drive's CN1 connector (with screw terminal connections), or 50-pin cables with flying leads

Note: These parts available for sale to North American locations only.

Tuning Technology

The L7C drive closes the loop on current, velocity, and position (depending on control mode selection). The 1kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and four (4) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can tune FBL/FCL motors up to 20:1 inertia mismatch.

There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor.

The drive has several tuning methods available:

- Online Auto Tuning—the drive can either tune the load live while an external controller moves the load to different positions or using the drive's internal tuning motion profile.
- Offline Auto Tuning—the drive tunes the load using the drive's internal tuning motion profile.
- Manual Tuning–all parameters are available to give power users the ultimate flexibility to tune their systems.

Built-in Indexer

While the L7C drives can accept traditional commands from host controllers, they can also provide their own internal motion control. 64 point-to-point position moves can be configured in the drive. These moves can be populated through the DriveCM configuration software or they can be written to by a PLC through the drive's RS422/485 serial port. The moves can be initiated by digital inputs or by serial commands. and can be sequenced internally with delays in between the moves or moves can be linked together so they are processed one after the other.

Multi-axis systems can be controlled via digital inputs, or serial communication. The motion can be commanded from a powerful external controller that sends out high speed pulses to each drive, or the motion can be initiated by a low-level controller (the simplest CLICK PLC) since each drive has a powerful indexer inside. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

Optional Holding Brake

Each L7C motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

LS Electric MSS Series In-Line Planetary Precision Gearboxes for Servo Motors

Need more torque from the motor? Have an inertia balancing issue in your design? The LS Electric MSS series gearboxes easily mate to FBL/FCL motors. Everything you need to mount your LS electric servo is included!

- Three gear ratios available (5:1, 10:1, 20:1)
- Mounting hardware included for attaching to FBL/FCL motors.
- Industry-standard mounting dimensions
- Thread-in mounting style
- Very low backlash: 7 arc-min single stage (5:1 and 10:1 ratios), 9 arc-min for two-stage (20:1 ratios).
- 1-year warranty



Servo drive overview

LED Display

The 5-digit display is used to indicate servo status and alarm. The keys can be used to configure the drive and to set up monitoring values (but we highly recommend using the Drive CM software instead).

Model Number

Clearly displayed on the front panel for easy identification.

Main Power Terminal

Incoming single phase 200-230 VAC (-15% to +10%, 50/60Hz)

Regenerative Resistor Terminal

Connection for optional external braking resistor (APCS-140R50-AD or APCS-300R30-AD)

Motor Output Terminal

Output power to the servo motor. LS motor power cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Keypad

Four Function keys:

MODE, UP, DOWN, SET

USB Connector

Used by Drive CM software for servo configuration.
Connect with a standard USB A to USB miniB cable (SV2-PGM-USB15, MOSAIC-CSU, or similar).

CN1 I/O Signal Connector

50-pin CN1 connector for drive I/O. Signals include high speed pulse inputs, 10 digital inputs, 8 digital outputs, 2 analog inputs (voltage and torque), serial Modbus RS422 (compatible with RS485 PLCs) and scalable encoder output.

Encoder Connector

14-pin CN2 connector for the motor encoder. LS Encoder cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Ground Terminals

Separate ground screws for incoming power supply ground and motor cable ground.

The LS Electric L7C servo drives are fully digital and include over 300 parameters to configure the drive for almost any application. For convenience, the parameters are grouped into several categories including:

- · Basic parameters
- · Gain parameters
- · I/O parameters
- · Velocity parameters
- Misc. parameters
- · Monitor parameters
- Index parameters

All parameters have commonly used default values which allow you to operate the L7C drive "out-of-the-box". The drive auto-detects the

LS servo motor (through the serial encoder) and sets up the default gains and limits based on the connected motor.

The drive can still be easily configured to your specific application, however. The Drive CM configuration software has a built-in Setup Wizard that will guide you through all the basic setup parameters. So, whether you want to use high speed pulse input, analog velocity, analog torque, or the powerful internal indexer for a control mode (or any multi-mode combination of these modes), the Setup Wizard will quickly and easily get your application started – from setting up the I/O to determining the appropriate homing sequence.

After configuration is complete, the Auto Tune features of the drive will get your application tuned for optimal responsiveness and performance.

Servo motor overview

Encoder Connector

9-pin watertight connector (8 pins used) for the 17-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

Non-Braking Motor

Motor Power Connector

4-pin watertight connector for motor power (U, V, W, and ground)



Low Inertia Motors

Low inertia designs result in high responsiveness and high speeds.

- 100W 60mm flange
- 200W 60mm flange
- 400W 60mm flange
- 750W 80mm flange
- 1kW 80mm flange

Keyed Shafts

"FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which must be "fitted" into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended".

- 100W 14mm diameter shaft
- 200W 14mm diameter shaft
- 400W 14mm diameter shaft
- 750W 19mm diameter shaft
- 1kW 19mm diameter shaft

All LS Electric L7C motors have keyed shafts for use with servo-grade clamp or compression couplings (recommended) or servo-grade keyed couplings. Some sanding/filing of the key may be required before pressing into the keyway. Do not modify the shaft/keyway.

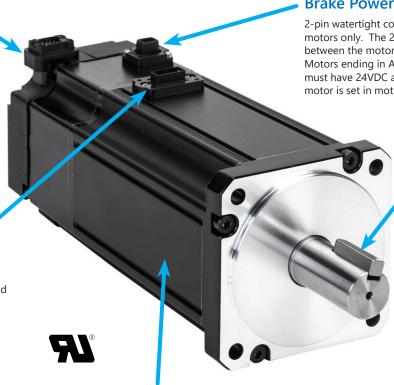
Encoder Connector

9-pin watertight connector (8 pins used) for the 17-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

Brake Motor

Motor Power Connector

4-pin watertight connector for motor power (U, V, W, and ground)



IP67 Housing

Brake Power Connector

2-pin watertight connector available on brake motors only. The 24VDC brake is located between the motor coils and the encoder. Motors ending in AYK2 have brakes. The brakes must have 24VDC applied to them before the motor is set in motion.

Keyed Shafts

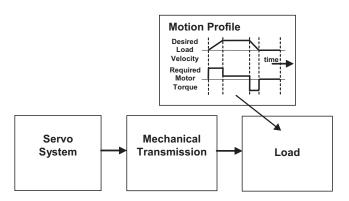
"FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which must be "fitted" into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended".

- 100W 14mm diameter shaft
- 200W 14mm diameter shaft
- 400W 14mm diameter shaft
- 750W 19mm diameter shaft
- 1kW 19mm diameter shaft

LSELECTRIC L7C AC Servo Systems

How to select and apply L7C systems

The primary purpose of the AC servo system is to precisely control the motion of the load. The most fundamental considerations in selecting the servo system are "reflected" load inertia, servo system maximum speed requirement, servo system continuous torque requirement, and servo system peak torque requirement. In a retrofit application, select the largest torque servo system that most closely matches these parameters for the system being replaced. In a new application, these parameters should be determined through calculation and/or



measurement. The Drive CM software has the ability to measure the load (reflected) inertia and accurately measure the motor torque output.

AutomationDirect has teamed with Copperhill Technologies to provide free servo-sizing software. "VisualSizer-SureServo" software will assist in determining the correct motor and drive for your application by calculating the reflected load inertia and required speed and torque based on the load configuration. "VisualSizer-SureServo" software can be downloaded from https://support.automationdirect.com/products/sureservo.html.

1. "Reflected" load inertia

The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the motor driveshaft. The ratio of "reflected" load inertia to motor inertia needs to be carefully considered when selecting the servo system.

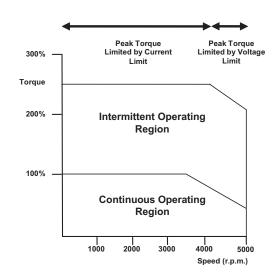
In general, applications that need high response or bandwidth

will benefit from keeping the ratio of load inertia to motor inertia as low as possible and ideally under 10:1. L7C Auto Tuning will still tune a system with very high response, up to 20:1 inertia mismatch. Higher system ratios can be implemented, but corresponding lower bandwidth or responsiveness must be accepted. The servo response including the attached load inertia is determined by the servo tuning. The L7C servo systems may be tuned automatically by the software/drive or manually by the user.

2. Torque and speed

With knowledge of the motion profile and any mechanical transmission between the motor and load, calculations can be made to determine the required servo motor continuous torque, peak torque, and maximum motor speed. The required amount of continuous torque must fall inside the continuous operating region of the system torque-speed curve (you can check the continuous torque at the average speed of the motion profile). The required amount of peak torque must also fall within the servo system's intermittent operating region of the system torque-speed curve (you need to check this value at the required maximum speed or torque). If you have an L7C system, these values are easily captured and recorded with the Scope feature built into the Drive CM software. If you are designing the system from scratch, use VisualSizer to define the system and calculate expected inertia and required power.

Compare the application's Continuous and Intermittent torque requirements to the torque-speed curves found in Chapter 16 of the L7C User Manual.



LSELECTRIC L7C AC Servo Systems

Application tip - coupling considerations

The LS Electric FBL/FCL motors have keyed shafts that can be used with keyed couplings or with clamp-on or compression style couplings. For standard keyed couplings, the servo key must be "fitted" into the keyway for optimum performance and longevity. Some minor filing and pressing of the key may be required. "Servo-grade" clamp-on or compression style couplings

are usually the best choice when you consider stiffness, torque rating, and inertia. Higher stiffness (lb-in/radian) is needed for better response but there is a trade-off between stiffness and the added inertia of the coupling. Concerning the torque rating of the coupling, use a safety factor of 1.25 over the servo's **peak** torque requirement of your application.

Click here for Available Couplings

Mechanical transmissions

Common mechanical transmissions include leadscrews, rack & pinion mechanisms, conveyors, gears, and timing belts. The use of leadscrew, rack & pinion, or conveyor are common ways to translate the rotary motion of the servo motor into linear motion of the load. Matched gearboxes are available from LS Electric that will work with the FBL and FCL motors. Each gearbox is selected to accept the 300% maximum available torque that could be generated by the motor. Gearboxes are available in 5:1, 10:1, and 20:1 ratios. The use of a speed reducer such as a gearbox or timing belt can be very beneficial as follows:

1. Reduction of reflected load inertia

As a general rule, it is beneficial to keep the reflected load inertia as low as possible while using the full range of servo speed. The LS Electric motors can rotate at a rated speed of 3000rpm (rated torque at rated speed). Their max speed (slightly less available torque) is 5000rpm. See the speed-torque curves for more information.

Example: A gearbox reduces the motor's required torque by a factor of the gear ratio, and reduces the reflected load inertia by a factor of the gear ratio squared. A 10:1 gearbox reduces output speed to 1/10, increases output torque 10 times, and decreases reflected inertia to 1/100.

However, when investigating the effect of different speed reduction ratios DO NOT forget to include the added inertia of couplings, gearbox, or timing belt pulleys. These added inertias can be significant, and can negate any inertia reduction due to the speed reduction.

2. Low speed and high torque applications

If the application requires low speed and high torque then it is common to introduce a speed reducer so that the servo system can operate over more of the available speed range. This could also have the added benefit of reducing the servo motor torque requirement which could allow you to use a smaller and lower cost servo system. Additional benefits are also possible with reduction in reflected inertia, increased number of motor encoder counts at the load, and increased ability to reject load disturbances due to mechanical advantage of the speed reducer.

3. Space limitations and motor orientation

FBL/FCL motors can be mounted in any orientation, but the shaft seal should not be immersed in oil (open-frame gearbox, etc.). Reducers can possibly allow the use of a smaller motor or allow the motor to be repositioned.



Motor	Motor Brake Motor		LS Electric MSS Planetary In-Line Gearboxes				
MOTOL	DIAKE WULUI	5:1 Gearbox	10:1 Gearbox	20:1 Gearbox			
APMC-FBL01AYK-AD	APMC-FBL01AYK2-AD	96200004	96200005	96200103			
APMC-FBL02AYK-AD	APMC-FBL02AYK2-AD	(MSS0601A-005KS-	(MSS0601A-010KS-	(MSS0902B-020KS-			
APMC-FBL04AYK-AD	APMC-FBL04AYK2-AD	B3110103C14)	B3110103C14)	B3110103C14)			
APMC-FCL08AYK-AD	APMC-FCL08AYK2-AD	96200007	96200008	96200257			
APMC-FCL10AYK-AD	APMC-FCL10AYK2-AD	(MSS0901A-005KS- C3110103C19)	(MSS0901A-010KS- C3110103C19)	(MSS1152B-020KS- C3110103C19)			

Here is a link to our **Timing Belts and Pulleys**

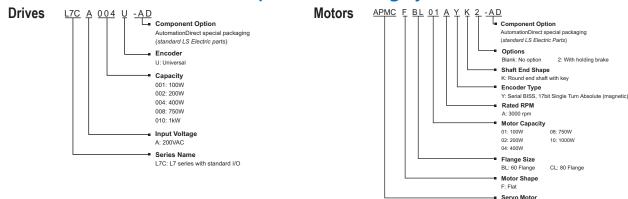
Ordering guide instructions

The following four pages are your ordering guide for LS Electric L7C servo systems. Each system has a torque-speed curve included for reference. This is the fundamental information that you need to select the servo motor and matching drive for your application.

Each system needs:

- Motor
- Drive
- Motor Power Cable
- Motor Encoder Cable
- I/O connections (either a 50-pin CN1 cable+terminals kit or a 50-pin flying lead cable(user provides terminal blocks))
- For brake motors you will also need a brake cable (connectorized on the motor end, two ferruled flying leads on the opposite end).

L7C series drives and motors part numbering system



Example of what you will need to build a complete servo system:





NOTE: Unit can be programmed via keypad. Optional programming software (free download). Use a standard USB-A to USB miniB cable for connectivity (SV2-PGM-USB15, MOSAIC-CSU, or equivalent)



NOTE: If you need a gear box for your configuration, reference the gearbox chart on the previous page. Ratios of 5:1, 10:1, and 20:1 are available for each FBL/FCL motor.



Torque to L7C System Quick Reference

System Rated Torque (N·m)	System Maximum Torque (N·m)	Suggested Servo Motor	Required Servo Drive
0.32	0.96	APMC-FBL01AYK-AD	
0.32	0.90	APMC-FBL01AYK2-AD	
0.64	1.91	APMC-FBL02AYK-AD	1704004114D
0.04	1.91	APMC-FBL02AYK2-AD	<u>L7CA004U-AD</u>
1.27	3.82	APMC-FBL04AYK-AD	
1.21	3.02	APMC-FBL04AYK2-AD	
2.39	7.16	APMC-FCL08AYK-AD	
2.39	7.10	APMC-FCL08AYK2-AD	1.7CA04011.AD
3.18	9.55	APMC-FCL10AYK-AD	<u>L7CA010U-AD</u>
ა.10	9.55	APMC-FCL10AYK2-AD	

L7C AC servo drive, motor, and cable combinations

xx = Cable length in meters
BN, EN, or PN = Standard cable (not continuous flex)
BF, EF, or PF = Flex-rated cable

AYK motors = no brake AYK2 motors = mechanical holding brake

Туре	System Torque Chart	L7C Drive	APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout																				
stem	Torque(N.m)200V230V		APMC-FBL01AYK-AD -	APCS-PNxxLSC-AD	APCS-ENxxES-AD	n/a																					
iertia Sy:	0.80 Peak Operating Range	-7CA004U-AD		APCS-PFxxLSC-AD	APCS-EFxxES-AD	n/a																					
100W Low Inertia System	0.40 Continuous Operating Range	ET CAUG40-AD	APMC-FBL01AYK2-AD-	APCS-PNxxLSC-AD	APCS-ENxxES-AD	APCS-BNxxQS-AD																					
100	0 1000 2000 3000 4000 5000 Speed(RPM)		711 WO 1 DEG 1711112 713	APCS-PFxxLSC-AD	APCS-EFxxES-AD	APCS-BFxxQS-AD																					
tem	Torque(N.m) — 200V 2,00 — 230V		APMC-FBL02AYK-AD -	APCS-PNxxLSC-AD	APCS-ENxxES-AD	n/a																					
ertia Sys	1,60 1,20 Peak Operating Range	L7CA004U-AD		APCS-PFxxLSC-AD	APCS-EFxxES-AD	n/a	APC-VSCN1Txx-AD																				
200W Low Inertia System	0.40 Continuous Operating Range				APMC-FBL02AYK2-AD-	APCS-PNxxLSC-AD	APCS-ENxxES-AD	APCS-BNxxQS-AD	or APC-CN10xA-AD																		
200	0 1000 2000 3000 4000 5000 Speed(RPM)																								<u>Al Wi</u>	711 WO 1 DESERTINE 715	APCS-PFxxLSC-AD
tem	Torque(N.m) 200V 4.00 230V		APMC-FBL04AYK-AD -	APCS-PNxxLSC-AD	APCS-ENxxES-AD	n/a																					
ertia Sys	3.20 Peak Operating Range	L7CA004U-AD		APCS-PFxxLSC-AD	APCS-EFxxES-AD	n/a																					
400W Low Inertia System	1.60 0.80 Continuous Operating Range	LTCAUU4U-AD		APCS-PNxxLSC-AD	APCS-ENxxES-AD	APCS-BNxxQS-AD																					
400	0 1000 2000 3000 4000 5000 Speed(RPM)		APMC-FBL04AYK2-AD	APCS-PFxxLSC-AD	APCS-EFxxES-AD	APCS-BFxxQS-AD																					
		1																									

L7C AC servo drive, motor, and cable combinations, continued

Туре	System Torque Chart	L7C Drive	APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout
tem	Torque(N.m) 200V 230V 8.00		APMC-FCL08AYK-AD	APCS-PNxxLSC-AD	APCS-ENxxES-AD	n/a	
750W Low Inertia System	6.40 Peak Operating Range	L7CA010U-AD		APCS-PFxxLSC-AD	APCS-EFxxES-AD	n/a	
W Low In	1.60 Continuous Operating Range		APMC-FCL08AYK2-AD	APCS-PNxxLSC-AD	APCS-ENxxES-AD	APCS-BNxxQS-AD	
750	0 1000 2000 3000 4000 5000 Speed(RPM)		ALIMO-I GLODALINZ-AD	APCS-PFxxLSC-AD	APCS-EFxxES-AD	APCS-BFxxQS-AD	APC-VSCN1Txx-AD
							or
stem	Torque(N.m) 200V 230V 10.00		APMC-FCL10AYK-AD	APCS-PNxxLSC-AD	APCS-ENxxES-AD	n/a	APC-CN10xA-AD
1.0k W Low Inertia System	8.00 Peak Operating Range L Continuous Operating Range O 1000 2000 3000 4000 5000 Speed(RPM)	L7CA010U-AD		APCS-PFxxLSC-AD	APCS-EFxxES-AD	n/a	
W Low I			APMC-FCL10AYK2-AD	APCS-PNxxLSC-AD	APCS-ENxxES-AD	APCS-BNxxQS-AD	
1.0k			AF MIC-1 OF 1041 (5-40	APCS-PFxxLSC-AD	APCS-EFxxES-AD	APCS-BFxxQS-AD	

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L7C Servo drive specifications

	L7C Servo Drive Specifications						
	Model	L7CA004U-AD	L7CA010U-AD				
	Price	\$286.00	\$360.00				
	Drawing	<u>PDF</u> <u>PDF</u>					
	Input Power	Single phase AC200 - 230	0V(-15 to +10%), 50–60Hz				
Power	Rated Current [Amps]	3.6	8.0				
Por	Peak Current [Amps]	9.0	20.25				
	Inrush Current	34A @ 240VAC	36A @ 240VAC				
بو	Speed Control Range	Maximur	n 1:5000				
nanc	Frequency Response	Maximum 1KHz or above (whe	en using 17-Bit Serial Encoder)				
rtori	Speed Variation Ratio	\pm 0.01 % or lower (when load changes between 0 a	nd 100%), ± 0.1 % or lower (temperature 25±10°C)				
ol Pe	Accel/Decel Time	Straight or S-curve acceleration/deceler	ration (0-10,000 ms), increment by 1ms				
Control Performance	Input Frequency	1Mpps, line driver / 20	Okpps, open collector				
)	Input Pulse Type	Pulse+Direction, CV	V+CCW, A/B Phase				
	Recommended Breaker	5A max	10A max				
	Recommended Fuse	15A max	30A max				
	SCCR Rating	5000A					
	Specification	ANSI/TIA/EIA - 422 standard specifications - connects to PLCs with RS485 ports (Click, P-Series, Do-More, etc.)					
	Protocol	MODBUS-RTU					
22	Synchro Method	Asynchronous					
RS-422	Power Consumption	100mA					
	Transmission Speed (bps)	9,600 / 19,200 /	38,400 / 57,600				
	Distance	200m maximum					
	Terminating Resistance	Optional built-in 120Ω resist	or for end-of-line termination				
Digital I/O Specifications	Digital Input	Input voltage range: 12–24 VDC Total 10 input channels (configurable) 34 different selectable functions for assignment. (*SV_ON, *SPD/LVSF1, *SPD2/LVSF2, *SPD3, *A-RST, *JDIR, *POT, *NOT, *EMG, *STOP, START, REGT, HOME, HSTART, ISEL0, ISEL1, ISEL2, ISEL3, ISEL4, ISEL5, PCON, GAIN2, P_CL, N_CL, MODE, PAUSE, ABSRQ, JSTART, PCLR, AOVR, INHIBIT, EGEAR1, EGEAR2, ABS_RESET)					
Digital I/O	Digital Output	Service rating: 24VDC ± 10%, 120mA 5 of 8 output channels are configurable, 3 channels are fixed with AL00, AL01, and AL02 19 different selectable functions for assignment (*ALARM, *READY, *ZSPD, *BREAK, *INPOS1, ORG, EOS, TGON, TLMT, VLMT, INSPD, WARN, INPOS2, IOUT0, IOUT1, IOUT2, IOUT3, IOUT4, IOUT5)					
	Analog Input	2 cha Analog speed input (Co Analog torque input (Co	mmand/Override) ± 10V				
ation	Connect	Р	С				
USB Communication	Communication Standard	USB 2.0 full speed	(applies standard)				
Соп	Specification	PC, USB 2.0 full spec	ed (applies standard)				
	Continued on next page						

^{*} Basic allocation signal

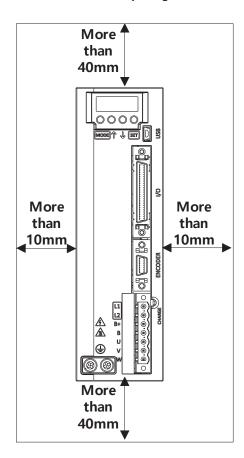
L7C Servo drive specifications, continued

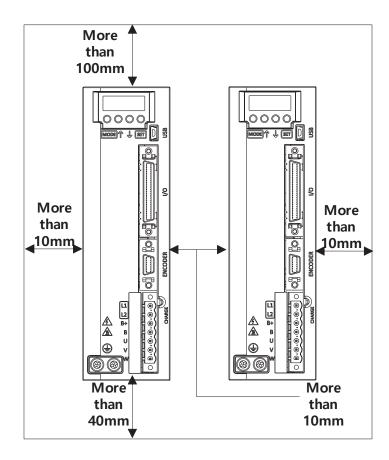
	L7C Servo Drive Specifications, continued						
		Continued from previous page					
	Model	<u>L7CA004U-AD</u>	<u>L7CA010U-AD</u>				
	Dynamic Braking	Standard built-in brake (activated when the se	ervo alarm goes off or when the servo is OFF)				
nction	Regenerative Braking	3.0 kW capacity with external resistor APCS-140R50	5.0 kW capacity with external resistor APCS-300R30				
Internal Function	Display Function	7 segments (5DIGIT)					
	Additional Function	Gain tuning, alarm history, JOG operation, homing					
1	Protection Function	Excessive current/voltage/overload/overheating/speed, excessive current limit, low voltage, encode position following/current sensing fail					
ent	Operating Temperature	0-56	0 °C				
ronme	Storage Temperature	-20 to -65°C					
Operation Environment	Operating Humidity	Below 80% relative humidity					
eratio	Storage Humidity	Below 90% relative humidity (avoid dew-condensation)					
Opi	Environment	Indoor, avoid corrosive, inflammable gas, or liquid and electrically conductive dust					
	Approvals	_C UL _{US} (E479434), CE					

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L7C Drive Standard Installation

L7C Drive Installation Spacing



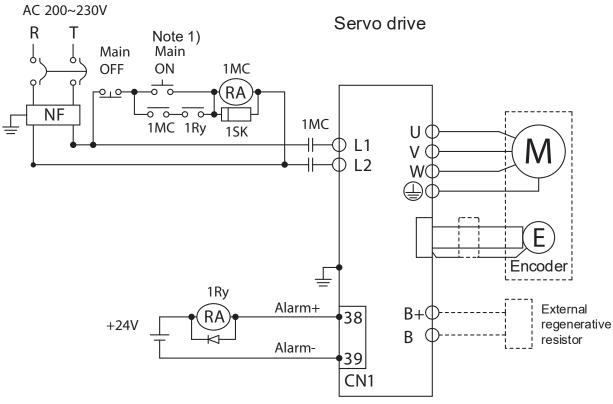


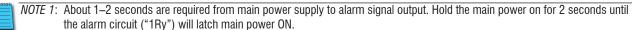
L7C Drive Installation Concerns:

- Install external regenerative resistors so that any heat generated does not affect the drive.
- Vertical installation only. For proper heat dissipation, ensure the back of the drive makes good contact with the subpanel.
- Protect the drive from metal chips and other falling debris during control panel assembly.
- Make sure that oil, water, or metal dust do not enter the drive.
- Protect the control panel by using an air purge system when installing it in any area where there are harmful gases or dust.

L7C Drive Wiring

L7C Power Supply Wiring

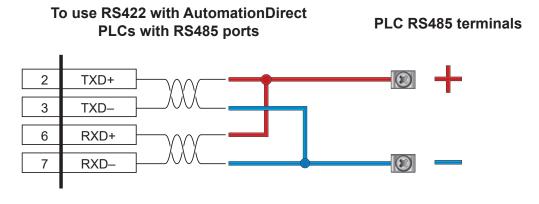






NOTE: If an external regen resistor is required, connect a regenerative resistance of $50W/100\Omega$ for the L7CA004U-AD, and $100W/40\Omega$ for the L7CA010U-AD.

Connect the L7C RS422 port to a PLC with an RS485 port:



NOTE: Do not use APC-VSCN1T(xx)-AD feedthrough terminal block if using PLC/Drive serial communication. Communication errors may occur due to disconnects in cable shields. Use APC-CN10xA-AD flying lead cables.

Non-brake Motor Specifications

L7C Non-brake Motor Specifications						
Model	APMC-FBL01AYK-AD	APMC-FBL02AYK-AD	APMC-FBL04AYK-AD	APMC-FCL08AYK-AD	APMC-FCL10AYK-AD	
Price	\$210.00	\$248.00	\$260.00	\$308.00	\$376.00	
Drawing	<u>PDF</u>	PDF	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	
Flange Size	60	60	60	80	80	
Rated Power [kW]	0.1	0.2	0.4	0.75	1	
Rated Torque [N·m] Note 1	0.32	0.64	1.27	2.39	3.18	
Max. Torque [N·m]	0.96	1.91	3.82	7.16	9.55	
Rated Speed [rpm]			3000			
Max. Speed [rpm]			5000			
Mechanical Time Constant [ms]	0.926	0.518	0.374	0.609	0.492	
Rated current [Amps] rms	0.95	1.45	2.6	5.02	5.83	
Max. Instantaneous Current [Amps] rms	2.85	4.35	7.8	15.07	17.5	
Rated Power Rate [kW/s]	11.09	27.6	27.07	45.09	62.08	
Electrical Time Constant [ms]	2.416	3.488	4.271	5.774	6.919	
Insulation Class			Class BE (CE, UL)			
Insulation Resistance			>10MΩ, 500VDC			
Insulation Strength			1.8 kVAC, 1 second		I	
Rotor Inertia [x10 ⁻⁴ kg m ²]	0.091	0.147	0.248	1.264	1.632	
Allowable Load Inertia Ratio		20 times motor inertia			notor inertia	
Max Radial Loading [N]	206			25	55	
Max Axial Loading [N]	69 98			8		
Vibration Grade [µm]	V15					
Vibration Capacity			19.6m/s ² or lower (2.5G)			

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).



Non-brake Motor Specifications, continued

	L7C Non-brake Motor Specifications, continued						
Model	APMC-FBL01AYK-AD	APMC-FBL02AYK-AD	APMC-FBL04AYK-AD	APMC-FCL08AYK-AD	APMC-FCL10AYK-AD		
Speed/Position Detector	Serial Single-Turn Encoder (17-bit), built-in						
IP Rating			Fully closed, self cooling IP67	,			
Rated Time			Continuous				
Operating Temperature			0°C to 40°C				
Storage Temperature			-10°C to 60°C				
Operating Humidity			Below 80% relative humidity				
Storage Humidity		Below 9	0% relative humidity, no cond	ensation			
Atmosphere		Avoid direct sunlight,	no corrosive gas, inflammable	e gas, oil mist, or dust			
E/V	Elevation/vibration 49m/s² (5G)						
Weight [kg]	0.56 0.74 1.06 2.68 3.3						
Agency Approvals			_C UR _{US} (E255738), CE				

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

Brake Motor Specifications

	L7C Brake Motor Specifications							
Model	APMC-FBL01AYK2-AD	APMC-FBL02AYK2-AD	APMC-FBL04AYK2-AD	APMC-FCL08AYK2-AD	APMC-FCL10AYK2-AD			
Price	\$386.00	\$434.00	\$444.00	\$484.00	\$569.00			
Drawing	<u>PDF</u>	PDF	PDF	PDF	<u>PDF</u>			
Flange Size	60	60	60	80	80			
Rated Power [kW]	0.1	0.2	0.4	0.75	1			
Rated Torque [N·m] Note 1	0.32	0.64	1.27	2.39	3.18			
Max. Torque [N·m]	0.96	1.91	3.82	7.16	9.55			
Rated Speed [rpm]			3000					
Max. Speed [rpm]			5000					
Mechanical Time Constant [ms]	0.926	0.518	0.374	0.609	0.492			
Rated current [Amps] rms	0.95	1.45	2.6	5.02	5.83			
Max. Instantaneous Current [Amps] rms	2.85	4.35	7.8	15.07	17.5			
Rated Power Rate [kW/s]	11.09	27.6	27.07	45.09	62.08			
Electrical Time Constant [ms]	2.416	3.488	4.271	5.774	6.919			
Insulation Class			Class BE (CE, UL)					
Insulation Resistance			>10MΩ, 500VDC					
Insulation Strength		Γ	1.8 kVAC, 1 second					
Rotor Inertia [x10 ⁻⁴ kg m ²]	0.091	0.147	0.248	1.264	1.632			
Allowable Load Inertia Ratio		20 times motor inertia		15 times n	notor inertia			
Max Radial Loading [N]		206		2	55			
Max Axial Loading [N]		69		9	98			
Brake Holding Torque [N·m (min)]		1.47		3.	23			
Brake Power Consumption (at 20°C) [W]	6.5							
Brake Release Time [ms (max)]	20							
Brake Pull-in Time [ms (max)]	50 60							
Vibration Grade [µm]	V15							
Vibration Capacity			19.6m/s ² or lower (2.5G)					

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).



Brake Motor Specifications, continued

L7C Brake Motor Specifications, continued						
Model	APMC-FBL01AYK2-AD	APMC-FBL02AYK2-AD	APMC-FBL04AYK2-AD	APMC-FCL08AYK2-AD	APMC-FCL10AYK2-AD	
Speed/Position Detector		Serial Multi-Turn Built-in Type (17-bit)				
IP Rating			Fully closed, self cooling IP67	7		
Rated Time			Continuous			
Operating Temperature			0°C to 40°C			
Storage Temperature			-10°C to 60°C			
Operating Humidity			Below 80% relative humidity			
Storage Humidity		Below 9	0% relative humidity, no cond	lensation		
Atmosphere		Avoid direct sunlight,	no corrosive gas, inflammabl	e gas, oil mist, or dust		
E/V	Elevation/vibration 49m/s² (5G)					
Weight [kg]	1.28 1.46 1.78 3.45 4.0				4.07	
Agency Approvals			_C UR _{US} (E255738), CE			

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

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Drive features

- Power: 100W-7.5 kW three-phase 230VAC/460VAC 100W-2.2 kW single-phase 230VAC capable
- Fully digital control with up to 1kHz velocity loop response
- Easy setup and diagnostics with DriveCM PC-based software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- Command options include:
 - ± 10V torque or velocity command
- Pulse train or master encoder position command (accepts line driver or open collector)
- Internal Indexer for position/speed-based moves include the option for simple registration correction. 64 individual move statements can be configured in the drive. Each Index contains its own distance, speed, accel, decel, and dwell parameters. These indexes can be set up through DriveCM software or modified in real-time with serial communication (PLC, HMI, etc.). The indexes can be initiated via Digital Inputs or through serial comms.
- The 1 kHz bandwidth allows for high-level automatic tuning. Several modes of tuning are available including Off-Line Auto Tuning (the drive initiates its own move commands while Auto tuning), On-Line Auto Tuning (an external controller sends the move commands while the drive Auto tunes), and Manual Tuning (all tuning values are adjusted by
- (16) Optically isolated digital inputs and (8) general purpose (user configurable) outputs, analog inputs for speed and torque control (2), and line driver and open collector output for encoder (with scalable resolution). Two configurable analog outputs for monitoring various servo parameters (actual speed, torque, current, position, etc.)
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.







Motor features

- Low and Medium inertia motors available:
- Low: 100W, 200W, 400W, 750W, 900W, 1kW, and 1.5 kW; @5000rpm
- Medium: 1.6 kW, 2.2 kW, 3.5 kW, 5.5 kW, and 7.5 kW; @3000rpm
- · Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style
- Integrated multi-turn absolute encoder with 19-bit resolution (524,288 pulses per revolution)
- Optional 24 VDC spring-set holding brakes (AMK2 and DMK2 motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for FBL/FCL brake motors)
- Motor cables available in standard or flex-rated lengths of 3, 5, 10, and
- Standard 50-pin DIN-rail mounted break-out kit for the drive's CN1 connector (with screw terminal connections), or 50-pin cables with flying leads

Note: These parts available for sale to North American locations only.

Tuning Technology

The L7P drive closes the loop on current, velocity, and position (depending on control mode selection). The 1kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and four (4) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can tune motors up to 20:1 inertia mismatch.

There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor.

The drive has several tuning methods available:

- Online Auto Tuning-the drive can either tune the load live while an external controller moves the load to different positions or using the drive's internal tuning motion profile.
- Offline Auto Tuning-the drive tunes the load using the drive's internal tuning motion profile.
- Manual Tuning–all parameters are available to give power users the ultimate flexibility to tune their systems.

Built-in Indexer

While the L7P drives can accept traditional commands from host controllers, they can also provide their own internal motion control. 64 point-to-point position moves can be configured in the drive. These moves can be populated through the DriveCM configuration software or they can be written to by a PLC through the drive's RS422/485 serial port. The moves can be initiated by digital inputs or by serial commands and include the ability to handle simple registration, and can be sequenced internally with delays in between the moves or moves can be linked together so they are processed one after the other.

Multi-axis systems can be controlled via digital inputs, or serial communication. The motion can be commanded from a powerful external controller that sends out high speed pulses to each drive, or the motion can be initiated by a low-level controller (the simplest CLICK PLC) since each drive has a powerful indexer inside. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

Optional Holding Brake

Each L7P motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

LS Electric MSS Series In-**Line Planetary Precision** Gearboxes for Servo Motors

Need more torque from the motor? Have an inertia balancing issue in your design? The LS Electric MSS series gearboxes easily mate to FBL/FCL/FE/FF motors. Everything you need for mounting is included!

- Three gear ratios available (5:1, 10:1, 20:1*)
- Mounting hardware included for attaching to FBL/FCL/FE/FF motors.
- · Industry-standard mounting dimensions
- Thread-in mounting style
- Very low backlash: 7 arc-min single stage (5:1 and 10:1 ratios), 9 arc-min two-stage (20:1
- 1-year warranty
- * The available gearbox ratios for the 7.5 kW motors are 5:1, 10:1, and 15:1, but the featuers are otherwise equivalent.





L7P Series AC Servo Systems

Servo drive overview

LED Display

The 5-digit display is used to indicate servo status and alarm.

DC Bus Charge LED

Visual indication of the drive's DC bus voltage level. Do not work on the drive until the Charge LED is

DIPswitch #2

120Ω terminating resistor for the RS422/RS485 network (use at the end of a multi-drop network

Analog Connector

4-pin analog monitoring connector (two +/- 10V analog outputs). See L7P-CON-F and L7P-CON-G for optional connectors

Rotary DIPswitch (0–15)

Sets RS422/485 comms station ID. Switch #3 adds 16 to the Node ID (so total addressable Node IDs = 0-31)

USB Connector

Used by Drive CM software for servo configuration. Connect with a standard USB A to USB mini-B cable (SV2-PGM-USB15, MOSAIC-CSU, or similar).

Firmware Upgrade: Use DriveCM software or attach a USB thumb drive with the new FW and update using USB On the Go (no PC required). See the UM for details.

RJ45 Connectors

Serial Modbus RS422 (compatible with RS485 PLCs). Use standard ethernet cables (not crossover cables) to connect multiple drives in a serial network.

CN1 I/O Signal Connector

50-pin CN1 connector for drive I/O. Signals include high speed pulse inputs, 16 digital inputs, 8 digital outputs, 2 analog inputs (voltage and torque), and scalable encoder output.

Encoder Connector

14-pin CN2 connector for the motor encoder. LS Encoder cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Motor Power Terminal

Incoming single or three phase 200-230 VAC or three phase 380-480 VAC, model dependent. (-15% to+10%, 50/60Hz)

Regenerative Resistor Terminal

Connection for optional external braking resistor

Control Power Terminal

Incoming single phase 200-230 VAC (or 380-480 VAC for "PB" models)(-15% to +10%, 50/60Hz)

Motor Output Terminal

Output power to the servo motor. LS motor power cables available in 3, 5, 10, and 20 meter lengths in standard and flexing cables.

Model Number

Clearly displayed on bottom of drive face for easy identification.

The LS Electric L7P servo drives are fully digital and include over 300 parameters to configure the drive for almost any application. For convenience, the parameters are grouped into several categories including:

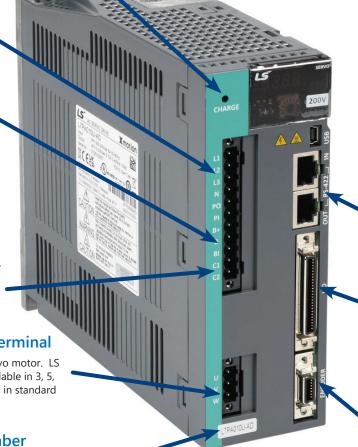
- Basic parameters
- · Gain parameters
- · I/O parameters
- · Velocity parameters
- Misc. parameters
- Monitor parameters
- Index parameters

All parameters have commonly used default values which allow you to operate the L7P drive "out-of-the-box". The drive auto-detects the

LS servo motor (through the serial encoder) and sets up the default gains and limits based on the connected motor.

The drive can still be easily configured to your specific application, however. The Drive CM configuration software has a built-in Setup Wizard that will guide you through all the basic setup parameters. So, whether you want to use high speed pulse input, analog velocity, analog torque, or the powerful internal indexer for a control mode (or any multi-mode combination of these modes), the Setup Wizard will quickly and easily get your application started – from setting up the I/O to determining the appropriate homing sequence.

After configuration is complete, the Auto Tune features of the drive will get your application tuned for optimal responsiveness and performance.





LSELECTRIC L7P/iX7NH AC Servo Systems

Servo motor overview

Encoder Connector

9-pin watertight connector for the 19-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

FBL/FCL **Series** Motor

Motor Power Connector

4-pin watertight connector for motor power (U, V, W, and ground) C SUS

Brake Power Connector

2-pin watertight connector available on FBL/FCL brake motors only. The 24VDC brake is located between the motor coils and the encoder. Motors ending in AMK2 and DMK2 have brakes. The brakes must have 24VDC applied to them before the

motor is set in motion.

IP67 Housing



Low inertia designs (AMK series) result in high responsiveness at high speeds for lighter loads.

- 100-100W motors available
- 60 and 80 mm flanges

Keyed Shafts

FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which may need to be "fitted" into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended.

• 100W 14mm diameter shaft

• 200W 14mm diameter shaft

• 400W 14mm diameter shaft

• 750W 19mm diameter shaft

• 1000W 19mm diameter shaft

All LS Electric FBL/FCL/FE/FF motors have keyed shafts for use with servo-grade clamp or compression couplings (recommended) or servo-grade keyed couplings. Some sanding/filing of the key may be required before pressing into the keyway. Do not modify the shaft/keyway.

Encoder Connector

17-pin watertight connector for the 19-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

FE/FF **Series** Motor

Motor Power Connector

4-pin watertight connector for motor power (U, V, W, and ground). For brake models, also supports brake wiring.



Low and Medium Inertia Motors

Low inertia designs (AMK series) result in high responsiveness at high speeds for lighter loads.

• 1500W motors with 130mm flanges available

Medium inertia designs (DMK series) result in high responsiveness at moderate speeds for heavier

• 1600-7500W motors available

130 and 180 mm flanges

Keyed Shafts

FE and FF motors are supplied with extra-large keyways, and slightly oversized keys which may need to be "fitted" into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended.

• 900W 19mm diameter shaft

• 1500W 19mm diameter shaft

• 1600W 22mm diameter shaft

24mm diameter shaft • 2200W • 3500W

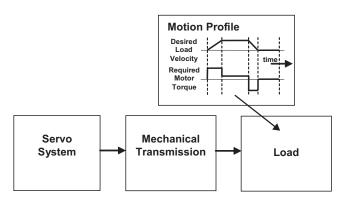
35mm diameter shaft • 5500W 35mm diameter shaft

• 7500W 42mm diameter shaft



How to select and apply L7P systems

The primary purpose of the AC servo system is to precisely control the motion of the load. The most fundamental considerations in selecting the servo system are "reflected" load inertia, servo system maximum speed requirement, servo system continuous torque requirement, and servo system peak torque requirement. In a retrofit application, select the largest torque servo system that most closely matches these parameters for the system being replaced. In a new application, these parameters should be determined through calculation and/or



measurement. The Drive CM software has the ability to measure the load (reflected) inertia and accurately measure the motor torque output.

AutomationDirect has teamed with Copperhill Technologies to provide free servo-sizing software. "VisualSizer-SureServo" software will assist in determining the correct motor and drive for your application by calculating the reflected load inertia and required speed and torque based on the load configuration. "VisualSizer-SureServo" software can be downloaded from https://support.automationdirect.com/products/lselectric.html.

1. "Reflected" load inertia

The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the motor driveshaft. The ratio of "reflected" load inertia to motor inertia needs to be carefully considered when selecting the servo system.

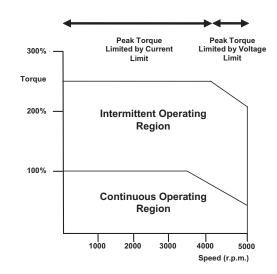
In general, applications that need high response or bandwidth

will benefit from keeping the ratio of load inertia to motor inertia as low as possible and ideally under 10:1. L7P Auto Tuning will still tune a system with very high response, up to 20:1 inertia mismatch. Higher system ratios can be implemented, but corresponding lower bandwidth or responsiveness must be accepted. The servo response including the attached load inertia is determined by the servo tuning. The L7P servo systems may be tuned automatically by the software/drive or manually by the user.

2. Torque and speed

With knowledge of the motion profile and any mechanical transmission between the motor and load, calculations can be made to determine the required servo motor continuous torque, peak torque, and maximum motor speed. The required amount of continuous torque must fall inside the continuous operating region of the system torque-speed curve (you can check the continuous torque at the average speed of the motion profile). The required amount of peak torque must also fall within the servo system's intermittent operating region of the system torque-speed curve (you need to check this value at the required maximum speed or torque). If you have an L7P system, these values are easily captured and recorded with the Scope feature built into the Drive CM software. If you are designing the system from scratch, use VisualSizer to define the system and calculate expected inertia and required power.

Compare the application's Continuous and Intermittent torque requirements to the torque-speed curves found in Chapter 16 of the L7P User Manual or in the system torque charts found on "L7P AC servo drive, motor, and cable combinations" on page tMNC-205.





LTP Series AC Servo Systems

Application tip coupling considerations

The LS Electric FBL/FCL motors have keyed shafts that can be used with keyed couplings or with clamp-on or compression style couplings. For standard keyed couplings, the servo key must be "fitted" into the keyway for optimum performance and longevity. Some minor filing and pressing of the key may be required. "Servo-grade" clamp-on or compression style couplings are usually the best choice when you consider stiffness, torque rating, and inertia. Higher stiffness (lb-in/radian) is needed for better response but there is a trade-off between stiffness and the added inertia of the coupling. Concerning the torque rating of the coupling, use a safety factor of 1.25 over the servo's **peak** torque requirement of your application.

Click here for Available Couplings

Mechanical transmissions

Common mechanical transmissions include leadscrews, rack & pinion mechanisms, conveyors, gears, and timing belts. The use of leadscrew, rack & pinion, or conveyor are common ways to translate the rotary motion of the servo motor into linear motion of the load. Matched gearboxes are available from LS Electric that will work with the LS servo motors. Each gearbox is selected to accept the 300% maximum available torque that could be generated by the motor. Gearboxes are available in 5.1, 10:1, and 20:1 ratios. The use of a speed reducer such as a gearbox or timing belt can be very beneficial as follows:

1. Reduction of reflected load inertia

As a general rule, keep the reflected load inertia as low as possible while using the full range of servo speed. The LS Electric motors can rotate at a rated speed of 2000 or 3000 rpm (rated torque at rated speed). Their max speed (slightly less available torque) is 3000 or 5000 rpm. See the speed-torque curves for more information.

Example: A gearbox reduces the motor's required torque by a factor of the gear ratio, and reduces the reflected load inertia by a factor of the gear ratio squared. A 10:1 gearbox reduces output speed to 1/10, increases output torque 10 times, and decreases reflected inertia to 1/100.

However, when investigating the effect of different speed reduction ratios DO NOT forget to include the added inertia of couplings, gearbox, or timing belt pulleys. These added inertias can be significant, and can negate any inertia reduction due to the speed reduction.

Here is a link to our Timing Belts and **Pulleys**

Ordering guide instructions

The following four pages are your ordering guide for LS Electric L7P servo systems. Each system has a torque-speed curve included for reference. This is the fundamental information that you need to select the servo motor and matching drive for your application.

Each system needs:

- Motor
- Drive
- Motor Power Cable
- Motor Encoder Cable
- I/O connections (either a 50-pin CN1 cable+terminals kit or a 50-pin flying lead cable(user provides terminal blocks))
- FBL/FCL brake motors require a brake cable. FE/ FF brake motors have brake wiring included in the power cable.

2. Low speed and high torque applications

If the application requires low speed and high torque then it is common to introduce a speed reducer so that the servo system can operate over more of the available speed range. This could also have the added benefit of reducing the servo motor torque requirement which could allow you to use a smaller and lower cost servo system. Additional benefits are also possible with reduction in reflected inertia, increased number of motor encoder counts at the load, and increased ability to reject load disturbances due to mechanical advantage of the speed reducer.

3. Space limitations and motor orientation

LS Electric servo motors can be mounted in any orientation, but the shaft seal should not be immersed in oil (open-frame gearbox, etc.). Reducers can possibly allow the use of a smaller motor or allow the motor to be repositioned.

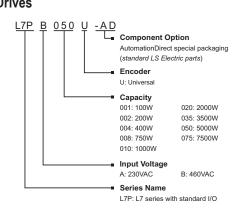


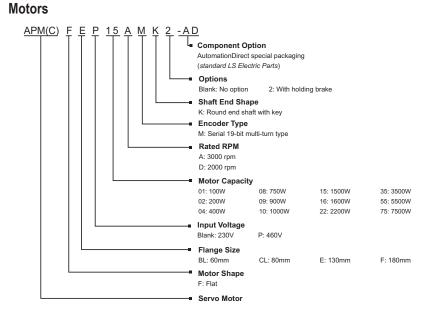
Matax	Droke Meter	LS Electric M	ISS Planetary In-Lii	Line Gearboxes	
Motor	Brake Motor	5:1 Gearbox	10:1 Gearbox	20:1 Gearbox	
APMC-FBL01AMK-AD	APMC-FBL01AMK2-AD				
APMC-FBL02AMK-AD	APMC-FBL02AMK2-AD	96200004	<u>96200005</u>	96200103	
APMC-FBL04AMK-AD	APMC-FBL04AMK2-AD				
APMC-FCL08AMK-AD	APMC-FCL08AMK2-AD	0000007	0000000	00000057	
APMC-FCL10AMK-AD	APMC-FCL10AMK2-AD	96200007	96200008	<u>96200257</u>	
APM-FEP09AMK-AD	APM-FEP09AMK2-AD				
APM-FE15AMK-AD	APM-FE15AMK2-AD	96200373	<u>96200378</u>	96200393	
APM-FEP15AMK-AD	APM-FEP15AMK2-AD				
APM-FE16DMK-AD	APM-FE16DMK2-AD	00000450	00000404	00000470	
APM-FEP16DMK-AD	APM-FEP16DMK2-AD	96200459	<u>96200464</u>	96200479	
APM-FE22DMK-AD	APM-FE22DMK2-AD	00000010	00000044	00000115	
APM-FEP22DMK-AD	APM-FEP22DMK2-AD	96200010	<u>96200011</u>	<u>96200445</u>	
APM-FF35DMK-AD	APM-FF35DMK2-AD				
APM-FFP35DMK-AD	APM-FFP35DMK2-AD	00000010	00000044	00000704	
APM-FF55DMK-AD	APM-FF55DMK2-AD	96200013	<u>96200014</u>	<u>96200701</u>	
APM-FFP55DMK-AD	APM-FFP55DMK2-AD				
APM-FF75DMK-AD	APM-FF75DMK2-AD	00000010	00000047	96200862	
APM-FFP75DMK-AD	APM-FFP75DMK2-AD	96200016	<u>96200017</u>	(15:1 gear ratio)	



LTP Series AC Servo Systems

L7P series drives and motors part numbering system





Example of what you will need to build a complete servo system:





NOTE: Unit can be programmed via keypad. Optional programming software (free download). Use a standard USB-A to USB miniB cable for connectivity (SV2-PGM-USB15, MOSAIC-CSU, or equivalent)



NOTE: If you need a gear box for your configuration, reference the gearbox chart on the previous page. Ratios of 5:1, 10:1, and 20:1 are available for each motor.



Torque to L7P System Quick Reference

Input Voltage	System Rated Torque (N·m)	System Maximum Torque (N·m)	Suggested Servo Motor	Required Servo Drive	
	0.32	0.96	APMC-FBL01AMK-AD		
	0.32	0.90	APMC-FBL01AMK2-AD		
	0.64	4.04	APMC-FBL02AMK-AD	1.7DA00411.AD	
		1.91	APMC-FBL02AMK2-AD	<u>L7PA004U-AD</u>	
	1.27	3.82	APMC-FBL04AMK-AD		
	1.21	3.02	APMC-FBL04AMK2-AD		
	2.39	7.16	APMC-FCL08AMK-AD		
	2.39	7.16	APMC-FCL08AMK2-AD	L7PA010U-AD*	
	3.10	9.55	APMC-FCL10AMK-AD	L/PAUTUU-AD	
	3.10	9.55	APMC-FCL10AMK2-AD		
2201/4.0	4.77	44.20	APM-FE15AMK-AD		
230VAC	4.77	14.32	APM-FE15AMK2-AD		
	7.63	00.00	APM-FE16DMK-AD	170400011 40	
		22.92	APM-FE16DMK2-AD	L7PA020U-AD	
	10.5	31.51	APM-FE22DMK-AD		
			APM-FE22DMK2-AD		
	16.7	50.1	APM-FF35DMK-AD	17040051140	
			APM-FF35DMK2-AD	L7PA035U-AD	
	26.25	78.76	APM-FF55DMK-AD	1.7DA05011.AD	
			APM-FF55DMK2-AD	<u>L7PA050U-AD</u>	
	35.81	89.53	APM-FF75DMK-AD	17040751140	
			APM-FF75DMK2-AD	L7PA075U-AD	
	2.86	0.50	APM-FEP09AMK-AD	17000401140	
		8.59	APM-FEP09AMK2-AD	<u>L7PB010U-AD</u>	
	4.77	44.00	APM-FEP15AMK-AD		
	4.77	14.32	APM-FEP15AMK2-AD		
	7.04	00.00	APM-FEP16DMK-AD	1.7DD00011.AD	
	7.64	22.92	APM-FEP16DMK2-AD	<u>L7PB020U-AD</u>	
400) (4.0	40.5	04.54	APM-FEP22DMK-AD		
460VAC	10.5	31.51	APM-FEP22DMK2-AD		
	40.74	=0.40	APM-FFP35DMK-AD	. =====================================	
	16.71	50.13	APM-FFP35DMK2-AD	<u>L7PB035U-AD</u>	
	00.00	2-2-	APM-FFP55DMK-AD	. =====================================	
	26.26	65.65	APM-FFP55DMK2-AD	<u>L7PB050U-AD</u>	
	05.04	00.50	APM-FFP75DMK-AD	1.7000	
	35.81	89.52	APM-FFP75DMK2-AD	<u>L7PB075U-AD</u>	

^{* 1}kW motors only: For single-phase supply, derate motor max torque to 200% or upsize the drive to L7PA020U-AD for max motor torque. ** 2.2 kW motors only: For single-phase supply, upsize the drive to L7PA035U-AD for max motor torque.

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L7P AC servo drive, motor, and cable combinations

xx = Cable length in meters BN/EN/PN = Standard cable (not continuous flex) BF/EF/PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

230V FBL/FCL Motor Systems

Туре	System Torque Chart	L7P Drive	APM/APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout
rstem	Torque (N.m)		APMC-FBL01AMK-AD	APCS-PNxxLS-AD	APCS-ENxxxES1-AD	n/a	
nertia Sy	0.60 Instantaneous Operation Range	L7PA004U-AD		APCS-PFxxLS-AD	APCS-EFxxxES1-AD		
100W Low Inertia System	0.40 Continuous Operating Range	27770010710	APMC-FBL01AMK2-AD	APCS-PNxxLS-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	
100	0 1000 2000 3000 4000 5000 Speed [RPM]		A WO I DECINITE AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	
tem tem	Torque (N.m)		ADMO EDLOGAMICAD	APCS-PNxxLS-AD	APCS-ENxxxES1-AD		
200W Low Inertia System	1,60 1,20 Instantaneous Operation Range	L7PA004U-AD	APMC-FBL02AMK-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	n/a	
W Low In	0.40 Continuous Operating Range	<u>L7PA0040-AD</u>		APCS-PNxxLS-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	APC-VSCN1Txx-AD or APC-CN10xA-AD
200	0 1000 2000 3000 4000 5000 Speed [RPM]		APMC-FBL02AMK2-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	
u.	Torque (N.m)			APCS-PNxxLS-AD	APCS-ENxxxES1-AD		
400W Low Inertia System	4,00 3,20 Instantaneous Operation Range		APMC-FBL04AMK-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	n/a	
W Low In	1.60 0.80 Continuous Operating Range	L7PA004U-AD	ADMC EDI OAAMK2 AD	APCS-PNxxLS-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	
400	0 1000 2000 3000 4000 5000 Speed [RPM]		APMC-FBL04AMK2-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	
u.	Torque (N.m)			APCS-PNxxLS-AD	APCS-ENxxxES1-AD		
750W Low Inertia System	8.00 6.40 Instantaneous Operation Range		APMC-FCL08AMK-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	n/a	
W Low Ine	3.20 - Continuous Operating Range	L7PA010U-AD		APCS-PNxxLS-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	
7501	0 1000 2000 3000 4000 5000 Speed [RPM]		APMC-FCL08AMK2-AD	APCS-PFxxLS-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	1

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Motion Control



L7P AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

Туре	System Torque Chart	L7P Drive	APMC Motor	Power Cable	Encoder Cable	Brake Cable	I/O Cable and Breakout
stem	Torque (N.m)		ADMC ECL 10AMK AD	APCS-PNxxxLS-AD	APCS-ENxxxES1-AD	n/a	
1.0k W Low Inertia System	8.00 6.00 Instantaneous Operation Range	L7PA010U-AD	APMC-FCL10AMK-AD	APCS-PFxxxLS-AD	APCS-EFxxxES1-AD	II/a	APC-VSCN1Txx-AD
W Low II	2,00 Continuous Operating Range			APCS-PNxxxLS-AD	APCS-ENxxxES1-AD	APCS-BNxxQS-AD	or APC-CN10xA-AD
1.0k	0 1000 2000 3000 4000 5000 Speed [RPM]		APMC-FCL10AMK2-AD	APCS-PFxxxLS-AD	APCS-EFxxxES1-AD	APCS-BFxxQS-AD	

^{*} Note - For single-phase supply, derate motor max torque to 200%, or upsize the drive to L7PA020U-AD for the torque curves in the graph.

230V FE Motor Systems

Туре	System Torque Chart	L7P Drive	APM/APMC Motor	Power Cable**	Encoder Cable	I/O Cable and Breakout
stem	Torque (N.m)		ADM FE4EAMY AD	APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
nertia Sy:	9.0 Instantaneous Operation Range	L7PA020U-AD***	APM-FE15AMK-AD	APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
1.5 kW Low Inertia System	3.0 Continuous Operating Range	L/PAUZUU-AD	APM-FE15AMK2-AD	APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
1.5 k	0 1000 2000 3000 4000 5000 Speed [RPM]		AFINH LIJANINZ-AD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	
stem	Torque (N.m)			APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
1.6 kW Medium Inertia System	25.0 20.0 15.0 Instantaneous Operation Range	<u>L7PA020U-AD***</u> -	APM-FE16DMK-AD	APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	APC-VSCN1Txx-AD
Medium	5,0 Continuous Operating Range			APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	or APC-CN10xA-AD
1.6 kW	0 1000 2000 3000 Speed [RPM]		APM-FE16DMK2-AD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	
rstem	Torque (N.m)			APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
Inertia S _]	28.0 21.0 Instantaneous Operation Range		APM-FE22DMK-AD	APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
2.2 kW Medium Inertia System	7.0 Continuous Operating Range	<u>L7PA020U-AD</u> ***		APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
2.2 kW	0 1000 2000 3000 Speed [RPM]		APM-FE22DMK2-AD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	

^{**} Note - Power cables with "B" in the part number are combination power/brake cables, providing power for both the motor and the brake. A brake cable is not required.
*** Note - For single-phase supply, upsize the drive to L7PA035U-AD for the torque curves in the graph.

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L7P AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

230V FF Motor Systems

Туре	System Torque Chart	L7P Drive	APM/APMC Motor	Power Cable*	Encoder Cable	I/O Cable and Breakout
System	Torque (N.m)		APM-FF35DMK-AD	APCS-PNxxIS-AD	APCS-ENxxxDS1-AD	
3.5 kW Medium Inertia System	40.0 Instantaneous Operation 30.0 Range	L7PA035U-AD	AFW-FF35DWK-AD	APCS-PFxxIS-AD	APCS-EFxxxDS1-AD	
/ Mediun	20.0 10.0 Continuous Operating Range 0 1000 2000 3000	<u>ETT AUSSU-ALD</u>	APM-FF35DMK2-AD	APCS-PNxxPB-AD	APCS-ENxxxDS1-AD	
3.5 KM	Speed [RPM]		AL WITH GODINICE AD	APCS-PFxxPB-AD	APCS-EFxxxDS1-AD	
System	Torque (N.m)		APM-FF55DMK-AD	APCS-PNxxJS-AD	APCS-ENxxxDS1-AD	
Inertia S	80,0 60,0 Instantaneous Operation Range 40,0 20,0 Continuous Operating Range	L7PA050U-AD	AFWH 1 33DWK-AD	APCS-PFxxJS-AD	APCS-EFxxxDS1-AD	APC-VSCN1Txx-AD
5.5 kW Medium Inertia System		<u>L71 A0300-AD</u>	APM-FF55DMK2-AD	APCS-PNxxLB-AD	APCS-ENxxxDS1-AD	or APC-CN10xA-AD
5.5 KM	0 1000 2000 3000 Speed [RPM]		AL WITH GODINICE ALD	APCS-PFxxLB-AD	APCS-EFxxxDS1-AD	
ıstem	Torque (N.m)			APCS-PNxxJS2-AD	APCS-ENxxxDS1-AD	
Inertia S _]	80.0 60.0 Instantaneous Operation Range	LZDAOZELLAD	APM-FF75DMK-AD	APCS-PFxxJS2-AD	APCS-EFxxxDS1-AD	
7.5 kW Medium Inertia System	40.0 20.0 Continuous Operating Range 0 1000 2000 3000	<u>L7PA075U-AD</u>	APM-FF75DMK2-AD	APCS-PNxxLB2-AD	APCS-ENxxxDS1-AD	
7.5 KM	0 1000 2000 3000 Speed [RPM]		ALINELLI JUNING-AU	APCS-PFxxLB2-AD	APCS-EFxxxDS1-AD	

*Note - Power cables with "B" in the part number are combination power/brake cables, providing power for both the motor and the brake. A brake cable is not required.



L7P AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

460V FEP Motor Systems

Туре	System Torque Chart	L7P Drive	APM/APMC Motor	Power Cable*	Encoder Cable	I/O Cable and Breakout
tem	Torque (N.m)		APM-FEP09AMK-AD	APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
ertia Sys	8.0 6.0 Instantaneous Operation Range	L7PB010U-AD	AL WELL OSANIKAD	APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
1kW Low Inertia System	2.0 Continuous Operating Range	<u> </u>	APM-FEP09AMK2-AD	APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
1KV	0 1000 2000 3000 4000 5000 Speed [RPM]		ALIVIT EL CONVINZEND	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	
u u	Torque (N.m)			APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
Syster	12,0		APM-FEP15AMK-AD			
Inertia	Instantaneous Operation 8.0 Range	<u>L7PB020U-AD</u>		APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
1.5 kW Low Inertia System	4.0 Continuous Operating Range		APM-FEP15AMK2-AD	APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
1.51	0 1000 2000 3000 4000 5000 Speed [RPM]		AL WELL TONWING PAD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	APC-VSCN1Txx-AD
	Torque (N.m)				1000 511 001 10	or
Syste	24.0		APM-FEP16DMK-AD	APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	APC-CN10xA-AD
, Inertia	18.0 Instantaneous Operation Range	L7PB020U-AD		APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
1.6 kW Medium Inertia System	6.0 Continuous Operating Range	<u>L11 B0200-AD</u>	APM-FEP16DMK2-AD	APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
1.6 KW	0 1000 2000 3000 Speed [RPM]		AFWII EF IODIWINZ-AD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	
ystem	Torque (N.m)		ADM FEDODOM AD	APCS-PNxxHS-AD	APCS-ENxxxDS1-AD	
Inertia S	24.0 Instantaneous Operation Range	1.7DD00011.AD	APM-FEP22DMK-AD	APCS-PFxxHS-AD	APCS-EFxxxDS1-AD	
2.2 kW Medium Inertia System	8.0 Continuous Operating Range	L7PB020U-AD	APM-FEP22DMK2-AD	APCS-PNxxNB-AD	APCS-ENxxxDS1-AD	
2.2 KM	0 1000 2000 3000 Speed [RPM]		AFINI-I LFZZDIVINZ-AD	APCS-PFxxNB-AD	APCS-EFxxxDS1-AD	

*Note - Power cables ending in "B-AD" are combination power/brake cables, and provide power for both the motor and the brake. A separate brake cable is not required.

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Motion Control



L7P AC servo drive, motor, and cable combinations, continued

xx = Cable length in meters BN, EN, or PN = Standard cable (not continuous flex) BF, EF, or PF = Flex-rated cable

AMK/DMK motors = no brake AMK2/DMK2 motors = mechanical holding brake

460V FFP Motor Systems

Туре	System Torque Chart	L7P Drive	APM/APMC Motor	Power Cable*	Encoder Cable	I/O Cable and Breakout
System	Torque (N.m)		ADM FEDSEDMIC AD	APCS-PNxxIS-AD	APCS-ENxxxDS1-AD	
3.5 kW Medium Inertia System	40.0 Instantaneous 30.0 Operation Range	LZDD025LLAD	APM-FFP35DMK-AD	APCS-PFxxIS-AD	APCS-EFxxxDS1-AD	
' Medium	20,0 10,0 Continuous Operating Range	L7PB035U-AD	APM-FFP35DMK2-AD	APCS-PNxxPB-AD	APCS-ENxxxDS1-AD	
3.5 KW	0 1000 2000 3000 Speed [RPM]		AFIVI-I I F33DIVINZ-AD	APCS-PFxxPB-AD	APCS-EFxxxDS1-AD	
tem	Torque (N.m)			APCS-PFxxJS1-AD**	APCS-ENxxxDS1-AD	
5.5 kW Medium Inertia System	70,0 56,0 42,0 Instantaneous Operation Range		APM-FFP55DMK-AD	APCS-PFxxJS1-AD	APCS-EFxxxDS1-AD	APC-VSCN1Txx-AD
Medium	28.0 14.0 Continuous Operating Range	<u>L7PB050U-AD</u>		APCS-PFxxLB1-AD**	APCS-ENxxxDS1-AD	or APC-CN10xA-AD
5.5 KW	0 1000 2000 3000 Speed [RPM]		APM-FFP55DMK2-AD	APCS-PFxxLB1-AD	APCS-EFxxxDS1-AD	
Systen	Torque (N.m) 90.0		APM-FFP75DMK-AD	APCS-PFxxJS1-AD**	APCS-ENxxxDS1-AD	
Inertia S	72.0 Instantaneous Operation Range	L7PB075U-AD	AL WELL LADONICAD	APCS-PFxxJS1-AD	APCS-EFxxxDS1-AD	
7.5 kW Medium Inertia System	36.0 18.0 Continuous Operating Range	LIFBUIJU-AD	APM-FFP75DMK2-AD	APCS-PFxxLB1-AD**	APCS-ENxxxDS1-AD	
7.5 KW	0 1000 2000 3000 Speed [RPM]		AFIVI-FFF (3DIVINZ-AD	APCS-PFxxLB1-AD	APCS-EFxxxDS1-AD	

*Note - Power cables ending in "B-AD" or "B1-AD" are combination power/brake cables, and provide power for both the motor and the brake. A separate brake cable is not

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^{** -} Non-flex power cable not available for some motors, use the flex cable for both flex and non-flex applications.



L7P Servo drive specifications

			L	7P Serv	o Drive	Specifi	cations							
	Model	L7PA004U-AD	L7PA010U-AD	L7PA020U-AD	L7PA035U-AD	L7PA050U-AD	<u>L7PA075U-AD</u>	<u>L7PB010U-AD</u>	<u>L7PB020U-AD</u>	L7PB035U-AD	L7PB050U-AD	L7PB075U-AD		
	Price	\$393.00	\$493.00	\$700.00	\$743.00	\$1,155.00	\$1,700.00	\$545.00	\$734.00	\$760.00	\$1,155.00	\$1,364.00		
	Drawing	PDF	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	PDF	PDF	PDF	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>		
	Input Power	Three phase 200–230 VAC (-15 to +10%), 50–60Hz** Three phase 380–480 VAC (-15 to +10%), 50–60Hz**									to +10%), 50)–60Hz		
Ja	Rated Current [Amps]	3.0	6.75	13.5	16.7	32.0	39.4	3.7	8	10.1	17.6	22.8		
Power	Peak Current [Amps]	9.0	20.25	40.5	50.1	90.9	98.5	11.1	24	30.3	47.25	67		
	Inrush Current	35A @ 2	230VAC	55A @ 2	230VAC	66A @ 230VAC	82A @ 230VAC	6	8A @ 480VA	С	114A @ 480VAC	56A @ 480VAC		
e,	Speed Control Range					М	aximum 1:50	00						
Control Performance	Frequency Response				Maximum	1KHz or abov	e (when usin	g 19-Bit Seria	al Encoder)					
erfor	Speed Variation Ratio		± 0.0	1 % or lower (when load cl	nanges betwe	en 0 and 100)%), ± 0.1 %	or lower (tem	perature 25±	:10°C)			
ol Pe	Accel/Decel Time			Straight or S-c	urve acceler	ation/decelera	ation (0–10,00	00 ms) and 0-	–1000 ms, ur	nit configurab	le			
Sonti	Input Frequency						ver / 200kpps							
	Input Pulse Type		Pulse and direction, CW+CCW, A/B Phase (quadrature)											
	Recommended Breaker (UL 489)	I .	15A 30 C trip curve C trip			40A B trip curve	50A B trip curve	10A B trip curve	20A B trip curve			0A curve		
	Recommended Fuse***	15A	20A	40A	70A	125A	150A	15A	25A	35A	50A	65A		
	SCCR Rating***		5kA											
	Specification	ANSI/TIA/EIA - 422 standard specifications - connects to PLCs with RS485 ports (Click, P-Series, Do-More, etc.)												
	Protocol	MODBUS-RTU												
~	Synchro Method	Asynchronous												
RS-422	Power Consumption					1	00mA or belo	W						
8	Transmission Speed (bps)				9,600 / 19,2	00 / 38,400 /	57,600 (can l	oe configured	at [0x3002]					
	Distance					2	00m maximu	m						
	Terminating Resistance					DIP S/W #	2 (On/Off), Bu	iilt-In 120Ω						
Digital I/O Specifications	Digital Input				START, *STO	Total 16 inpo lifferent selec P, *REGT, *E	age range: 12 ut channels (o table function MG, *HOME, ART, JDIR, P PROBE2)	configurable) s for assignm *HSTART, *I	SELO, *ISEL^					
Digital I/O	Digital Output	(*ALARM±,	*READY±, *	BRAKE±, *IN	IPOS1±, *OF	8 output ch different select RG±, *EOS±,	g: 24VDC ± nannels are contable function *TGON±, *T ±, IOUT3±, IC	onfigurable ns for assignn LMT,± VLMT	±, INSPD±, 2	ZSPD±, WAF	RN±, INPOS2	£±, IOUT0±,		
Analog 1/0	Analog Input						2 channel ut (Command nand (Comma							
Aná	Analog Output				15 fund	tion outputs	2 channels can be selecti	vely allocated	d ± 10V					
				C	ontinued or	next page								

* Basic allocation signal.

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^{**} See Single-phase power input section on the following page for single phase considerations.
*** Use class CC or High Speed J (JHL series) current limiting fuses to prevent nuisance tripping and to increase panel SCCR rating.

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LSELECTRIC L7P Series AC Servo Systems

L7P Servo drive specifications, continued

	L7P S	ervo Drive Spec	ifications, <i>continued</i>						
		Continued from	previous page						
	Model	L7PA004U-AD	All Other L7P Series Drives						
ation	Connect	Fi	Configuration/Monitor: PC rmware Update: PC or USB On the Go (no PC needed)						
USB Communication	Communication Standard		USB 2.0 full speed (applies standard)						
Сош	Specification		PC, USB 2.0 full speed (applies standard)						
	Mechanical Brake	Standard built-in b	rake (activated when the servo alarm goes off or when the servo is OFF)						
l uo	Regenerative Braking	Default built-in, external installation possible							
Internal Function	Display Function	7-segment display (5 digits)							
rnal F	Self-setting Function	Drive node address	can be set using rotary switch and DIP switch #3 (available Nodes = 0–31)						
Inter	Additional Function		Gain tuning, alarm history, JOG operation, homing						
	Protection Function	Excessive current/cur	rent limit/voltage/speed, overload, overheating, low voltage, encoder failure, position following failure, current sensing failure						
ant	Operating Temperature		0-50 °C [32-122 °F]						
ironme	Storage Temperature		-20 to -70°C [-4 to 158 °F]						
n Envi	Operating Humidity		Below 80% relative humidity						
Operation Environment	Storage Humidity		Below 90% relative humidity (avoid dew-condensation)						
Opi	Environment	Indoor, avoid	corrosive, inflammable gas, or liquid and electrically conductive dust						
	Approvals	_C UR _{US} (E479434), CE	_C UL _{US} (E479434), CE						

Single-phase Power Input

Although designed with 3-phase AC input power in mind, some L7P systems are capable of supporting single-phase AC input power. With three phase AC supply, the L7P motor/drive combination supplies 300% rated maximum motor torque (see the Instantaneous Operation Range in the torque-speed charts above). With single phase AC supply some ratings will have limited maximum/intermittent torque, and/or the next larger drive size will be required.

Dr	ive Derating for 23	OV Single-phase Usage
3-phase Motor/Drive Rating	Drive to use with Single- phase Input	Motor Torque Derating for Single-phase Input
100W/200W/400W	L7PA004U-AD	Single phase and three phase input both produce 300% max torque. No derating required.
750W	L7PA010U-AD	Single phase and three phase input both produce 300% max torque. No derating required.
1kW	L7PA010U-AD or L7PA020U-AD	2kW drive produces 300% max torque. The 1kW drive can be used, but the motor can only provide 200% max torque.
1.5 kW/1.6 kW	L7PA035U-AD	3.5 kW drive produces 200% max torque
2.2 kW		3.5 kW drive produces 150% max torque
3.5 kW and up	n/a	No single phase capability

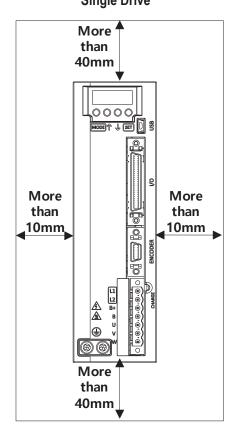
www.automationdirect.com **Motion Control**



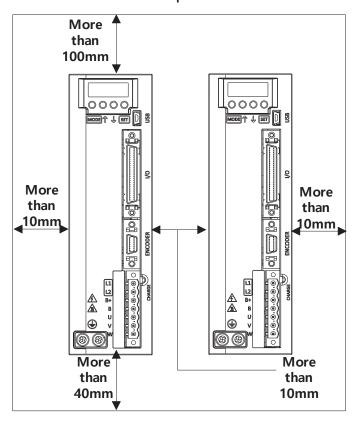
L7P Drive Standard Installation

L7P Drive Installation Spacing

Single Drive



Multiple Drives



L7P Drive Installation Concerns:

- Install external regenerative resistors so that any heat generated does not affect the drive.
- · Vertical installation only. For proper heat dissipation, ensure the back of the drive makes good contact with the subpanel.
- Protect the drive from metal chips and other falling debris during control panel assembly.
- Make sure that oil, water, or metal dust do not enter the drive.
- · Protect the control panel by using an air purge system when installing it in any area where there are harmful gases or dust.

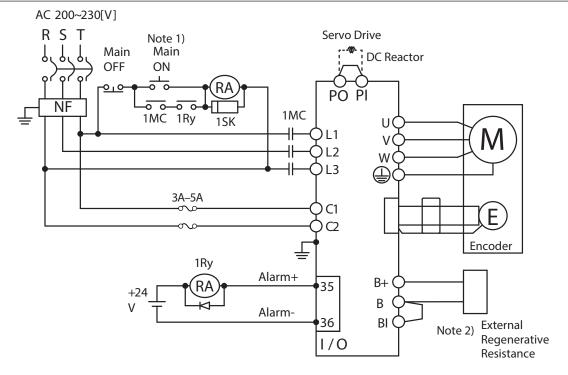


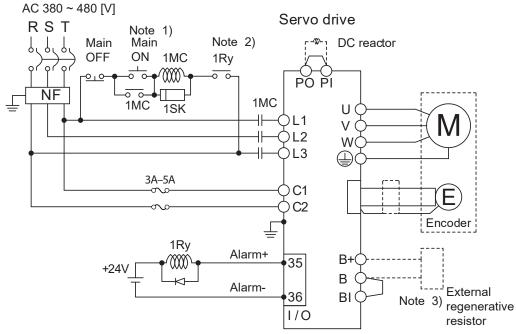
L7P Drive Wiring

L7P Power Supply Wiring



NOTE: Single phase can use 2 of R, S, or T. See "Single-phase Power Input" on page tMNC-209 for more information.







NOTE 1: About 1-2 seconds are required from main power supply to alarm signal output. Hold the main power on for 2 seconds until the alarm circuit ("1Ry") will latch main power ON.

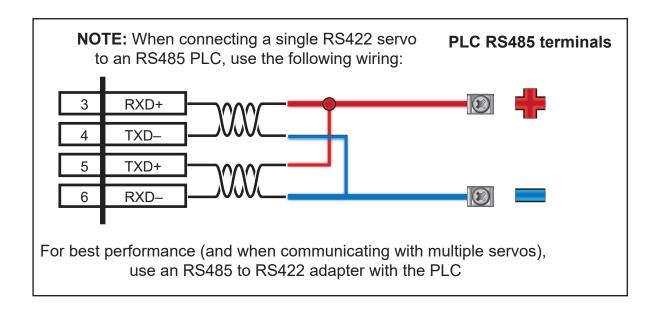


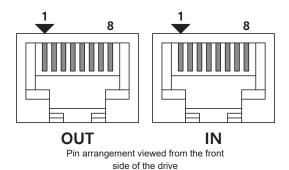
NOTES 2 & 3: Remove the jumper for the inertnal resistor between B and BI, and connect the external resistor to the B+ and B pins. If an external regen resistor is required, see the available regen resistors under the Motion Control category at AutomationDirect.com (APCS-140R50-AD, APCS-300R30-AD, etc.).

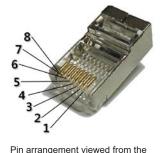


L7P Drive Wiring, continued

Connect the L7P RS422 port to a PLC with an RS485 port:







connector

Pin#	Pin Function
1	Not used
2	Not used
3	RXD+
4	TXD-
5	TXD+
6	RXD-
7	Not used
8	Not used



NOTE: When connecting multiple drives, use a standard RJ45 ethernet patch cable (not a crossover cable) for the serial network. On the last drive only, set DIP switch #2 = 0N (120 Ohm terminating resistor).



LSELECTRIC L7P/iX7NH AC Servo Systems

60-80 mm Frame Motor Specifications

	L	7P/iX7NH	60-80	mm Fran	ne Motor	Specific	ations			
Model	APMC-FBL01AMK-AD	APMC-FBL02AMK-AD	APMC-FBL04AMK-AD	APMC-FCL08AMKAD	APMC-FCL10AMKAD	APMC-FBL01AMK2-AD	APMC-FBL02AMK2-AD	APMC-FBL04AMK2-AD	APMC-FCL08AMK2-AD	APMC-FCL10AMK2-AD
Price	\$273.00	\$318.00	\$329.00	\$404.00	\$449.00	\$490.00	\$515.00	\$525.00	\$604.00	\$640.00
Drawing	PDF	PDF	PDF	PDF	<u>PDF</u>	PDF	PDF	PDF	PDF	PDF
Input Voltage					230	VAC				
Drive Compatibility					L7P and iX	7NH drives				
Integrated Brake			No					Yes		
Flange Size (mm)		60	T	8	0		60		8	0
Rated Power [kW]	0.1	0.2	0.4	0.75	1	0.1	0.2	0.4	0.75	1
Rated Torque [N·m] ^{Note 1}	0.32	0.64	1.27	2.39	3.18	0.32	0.64	1.27	2.39	3.18
Max. Torque [N·m]	0.96	1.91	3.82	7.16	9.55	0.96	0.96 1.91 3.82			9.55
Rated Speed [rpm]					30	00				
Max. Speed [rpm]		Γ	Γ	I	50	00		T	T	
Mechanical Time Constant [ms]	0.926	0.518	0.374	0.609	0.492	0.926	0.518	0.374	0.609	0.492
Rated current [Amps] rms	0.95	1.45	2.6	5.02	5.83	0.95	1.45	2.6	5.02	5.83
Max. Instantaneous Current [Amps] rms	2.85	4.35	7.8	15.07	17.5	2.85	4.35	7.8	15.07	17.5
Rated Power Rate [kW/s]	11.09	27.6	27.07	45.09	62.08	11.09	27.6	27.07	45.09	62.08
Electrical Time Constant [ms]	2.416	3.488	4.271	5.774	6.919	2.416	3.488	4.271	5.774	6.919
Insulation Class					Class BE	(CE, UL)				
Insulation Resistance					>10MΩ,	500VDC				
Insulation Strength		I	<u> </u>	I	1.8 kVAC,	1 second		T	ı	I
Rotor Inertia [x10 ⁻⁴ kg m ²]	0.091	0.147	0.248	1.264	1.632	0.091	0.147	0.248	1.264	1.632
Allowable Load Inertia Ratio	20	times motor ine	ertia	15 times m	otor inertia	20	times motor ine	ertia	15 times m	notor inertia
Max Radial Loading [N]	206 255 206							2	55	
Max Axial Loading [N]		69		9	8		69		9	8
Vibration Grade [µm]					V	15				
Vibration Capacity					19.6 m/s ² or	lower (2.5G)				
Speed/Position Detector				Se	rial multi-turn b	uilt-in type (19-	bit)			
Weight [kg]	0.56	0.74	1.06	2.68	3.3	1.28	1.46	1.78	3.45	4.07

Note 1–The rated torque is the continuous permissible torque between the 0° C and 40° C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: $250 \text{mm} \times 250 \text{mm} \times 60 \text{mm}$ made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

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Motion Control



L7P/iX7NH AC Servo Systems

130mm Frame Motor Specifications

			L7P/iX	7NH 1	30mm	Frame	Moto	r Spec	ificatio	ons				
Model	APM-FE15AMK-AD	APM-FE16DMKAD	APM-FE22DMK-AD	APM-FE15AMK2-AD	APM-FE16DMK2-AD	APM-FE22DMK2-AD	APM-FEP09AMKAD	APM-FEP15AMKAD	APM-FEP16DMK-AD	APM-FEP22DMK-AD	APM-FEP09AMK2-AD	APM-FEP15AMK2-AD	APM-FEP16DMK2-AD	APM-FEP22DMK2-AD
Price	\$644.00	\$690.00	\$745.00	\$845.00	\$893.00	\$955.00	\$590.00	\$646.00	\$698.00	\$753.00	\$793.00	\$878.00	\$930.00	\$962.00
Drawing	PDF	PDF	PDF	PDF	<u>PDF</u>	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF
Input Voltage		230VAC 460VAC												
Drive Compatibility			L7P and iX	7NH drives						L7P o	drives			
Integrated Brake		No			Yes			N	lo			Y	es	
Flange Size (mm)							13	30						
Rated Power [kW]	1.5	1.6	2.2	1.5	1.6	2.2	0.9	1.5	1.6	2.2	0.9	1.5	1.6	2.2
Rated Torque [N·m]	4.77	7.63	10.5	4.77	7.63	10.5	2.86	4.77	7.64	10.5	2.86	4.77	7.64	10.5
Max. Torque [N·m]	14.32	22.92	31.51	14.32	22.92	31.51	8.59	14.32	22.92	31.51	8.59	14.32	22.92	31.51
Rated Speed [rpm]	3000	2000 3000 2000 3000 2000 3000						2000						
Max. Speed [rpm]	5000	30	00	5000	30	00	50	00	30	00	50	000	30	000
Mechanical Time Constant [ms]	1.520	1.278	1.176	1.520	1.278	1.176	2.428	1.609	1.337	1.261	2.428	1.609	1.337	1.261
Rated current [Amps] rms	9.15	10.98	12.97	9.15	10.98	12.97	3.47	6.68	4.97	6.8	3.47	6.68	4.97	6.8
Max. Instantaneous Current [Amps] rms	27.45	32.94	38.91	27.45	32.94	38.91	10.4	20.03	14.92	20.4	10.4	20.03	14.92	20.4
Rated Power Rate [kW/s]	22.38	39.89	57.9	22.38	39.89	57.9	14.5	22.4	39.92	57.95	14.5	22.4	39.92	57.95
Electrical Time Constant [ms]	9.819	10.352	11.284	9.819	10.352	11.284	7.763	9.761	10.656	10.623	7.763	9.761	10.656	10.623
Insulation Class								3						
Insulation Resistance							101	ΜΩ						
Insulation Strength			1.8 kVAC,	1 second						2.2 kVAC	1 second			
Rotor Inertia [x10 ⁻⁴ kg m ²]	10.18	14.62	19.43	10.18	14.62	19.43	5.659	10.179	14.619	19.04	5.659	10.179	14.619	19.04
Allowable Load Inertia Ratio							10 times m	otor inertia						
Max Radial Loading [N]							72	25						
Max Axial Loading [N]							36	62						
Vibration Grade [µm]							1	5						
Vibration Capacity							5	G						
Speed/Position Detector							Serial typ	e (19-bit)						
Weight [kg]	6.7	8.5	10.1	8.28	10.02	11.59	5.04	6.7	8.5	10.1	6.58	8.28	10.02	11.59
Note 1-The rated torque is														

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

LSELECTRIC L7P/iX7NH AC Servo Systems

180mm Frame Motor Specifications

		L7P/iX7NH 180mm Frame Motor Specifications							
APM-FF35DMK-AD APM-FF35DMK-AD APM-FF35DMK-AD APM-FF75DMK-AD APM-FF75DMK-AD APM-FF75DMK-AD APM-FF75DMK-AD APM-FF75DMK-AD	APM-FFP55DMK2-AD	APM-FFP75DMK2-AD							
Price \$999.00 \$1,240.00 \$1,499.00 \$1,297.00 \$1,562.00 \$1,827.00 \$1,035.00 \$1,235.00 \$1,510.00 \$1,358.00	\$1,557.00	\$1,830.00							
Drawing PDF PDF	PDF	PDF							
Input Voltag e 230VAC 460VAC									
Drive Compatibility L7P and iX7NH drives L7P drives									
Integrated Brake No Yes No	Yes								
Flange Size (mm) 180									
Rated Power [kW] 3.5 5.5 7.5 3.5 5.5 7.5 3.5	5.5	7.5							
Rated Torque [N·m] ^{Note 1} 16.7 26.25 35.81 16.7 26.25 35.81 16.71 26.26 35.81 16.71	26.26	35.81							
Max. Torque [N·m] 50.1 78.76 89.53 50.1 78.76 89.53 50.13 65.65 89.52 50.13	65.65	89.52							
Rated Speed [rpm] 2000									
Max. Speed [rpm] 3000									
Mechanical Time Constant [ms] 1.222 0.829 0.723 1.222 0.829 0.723 1.058 0.847 0.764 1.058	0.847	0.764							
Rated current [Amps] rms 16.48 28.78 32.95 16.48 28.78 32.95 9.09 14.70 18.97 9.09	14.70	18.97							
Max. Instantaneous 49.44 86.34 82.38 49.44 86.34 82.38 27.26 36.75 47.42 27.26	36.75	47.42							
Rated Power Rate [kW/s] 59.89 93.27 120.15 59.89 93.27 120.15 59.98 93.38 120.15 59.98	93.38	120.15							
Electrical Time Constant [ms] 15.021 19.086 20.567 15.021 19.086 20.567 14.452 23.484 20.351 14.452	23.484	20.351							
Insulation Class B									
Insulation Resistance 10MΩ									
Insulation Strength 1.8 kVAC, 1 second 2.2 kVAC, 1 second	1								
Rotor Inertia [x10-4 kg m²] 46.56 73.85 106.7 46.56 73.85 106.7 46.56 73.85 106.73 46.56	73.85	106.73							
Allowable Load Inertia Ratio 5 times motor inertia	5 times motor inertia								
Max Radial Loading [N] 1548									
Max Axial Loading [N] 519	519								
Vibration Grade [µm]	15								
Vibration Capacity 5G	5G								
Speed/Position Detector Serial type (19-bit)									
Weight [kg] 17.4 25.2 34 24.6 32.4 39 17.4 25.2 34 24.6	32.4	39							

Note 1-The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

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Motion Control

L7P/iX7NH AC Servo Systems

Environmental Specifications

L7P/iX7NH Motor Environmental Specifications								
Model Series	APMC-FBL/FCL Motors	MC-FBL/FCL Motors FE/FEP Motors						
IP Rating	Fully closed self-cooling IP67 ¹ Fully closed self-cooling IP65 ¹							
Rated Time	Continuous							
Operating Temperature	0 to 40 °C [32 to 104 °F]							
Storage Temperature	-10 to 60 °C [14 to 140 °F]							
Operating Humidity		Below 80% RH						
Storage Humidity	Below 90% RH (non condensing)							
Atmosphere	Avoid direct sunlight and corrosive/flammable gas or liquid							
E/V	Elevation/vibration 49m/s ² (5G)							
Agency Approvals		_C UR _{US} (E255738), CE						

Note 1 - Shaft connection not included. The IP rating for attached reducers/gearboxes is not guaranteed. Cables may not qualify marked IP rating if bent beyond designated specifications. Use suggested cables for maintaining IP rating.

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LECTRIC LS Electric AC Servo Systems

Drive Software

Drive CM Configuration Software

Drive CM is an optional free downloadable configuration software package for LS Electric servo drives. A PC may be directly connected to the servo drive via any standard USB-A to USB mini-B cable (SV2-PGM-USB15 or SV2-PGM-USB30 recommended).

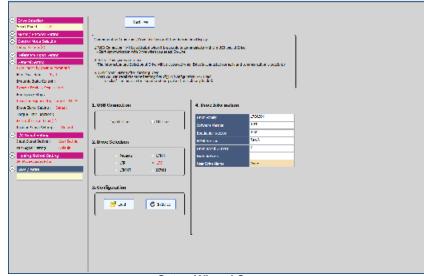
Features

- Easy-to-use setup wizard guides you through the most common setup functions.
- Digital I/O / Jog Control allows the user to operate the servo system from the PC. This allows the servo to perform some basic motion and check the I/O during startup.
- Parameter Object editor for setting up all drive parameters.
- Tune and check the servo response in real-time using the scope feature.
- Upload and download the drive configuration. Save the drive configuration as a file for backup or future use.
- Edit the drive configuration.
- · View all drive faults.
- View drive variable trends in real-time.
- (L7P/L7C series only) Set up 64 internal Indexes (point-to-point moves) that can be triggered by digital inputs or serial communications. Indexes can repeat and can initiate another Index when one move completes.

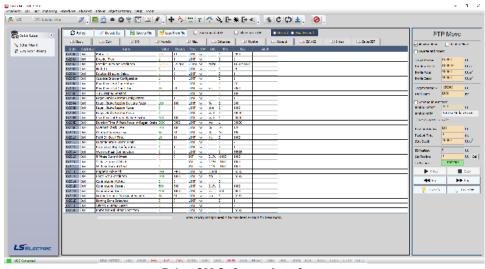
Download

Download the Drive CM software from AutomationDirect's LS Electric support page:

https://support.automationdirect.com/products/lselectric.html



Setup Wizard Screen



Drive CM Software Interface

Parameter Object Editor

The Drive CM configuration tool logically organizes all servo drive object parameters for viewing and editing using the Object Dictionary screen. Each parameter has a factory default that usually allows the servo to run "out-of-the-box".

The parameters can be easily changed with available setting ranges displayed. Tuning modes and parameters can also be changed using Drive CM. After the parameters have been defined, the complete setup can be stored and archived. Drive configurations can be uploaded, edited, saved, and downloaded as often as necessary.

Using the Drive CM software you can also configure and commission your drive without having to be connected to the master controller.



ELECTRIC LS Electric AC Servo Systems

Drive Software, continued

Digital I/O, Jog Control, and Scope

The Digital I/O / Jog Control screen allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.

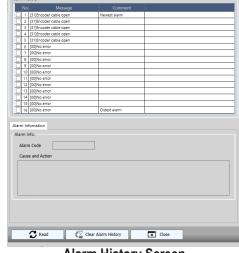
Drive CM also includes a powerful scope function that allows the user to have as many as four channels of data displayed simultaneously. Each channel has a drop-down table to select the data to be displayed. The scope has the ability to save traces to a file and load those traces for offline review/analysis. This function is a valuable tool for tuning LS Electric servo drives.



Jog Control / Scope Screen



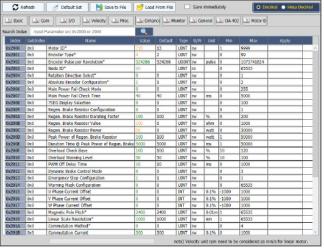
General Setup Screen



Alarm History Screen

	Inlest:	tides t	Index 2	Index 5	Indexer Test	
					Saller 1	
Index Lype	Appoints v	Rolativo v	Rolativo v	Roletivo v	Step Sealerston 200000 UUS12	
Distance [UU]	0	13079	54000	1100010	Gunnake /	
(Monty [UU/s]	100000	.00000	100000	100000	120 m	
Acceleration [UU/c^2]	100700	1000000	1001300	1000000	1199965 04711 91	
Deceleration (UU/s^3)	1000000	TREATMEN	1001300	1000000		
Receiptor Detorac[CC]	100000	100000	100000	100000	SACH FOR BOT BOT BOT STOP	
Registration Velocity (UU/s)	100000	100000	100000	1000000		
Deposit Good	1	4	1	1	FOOM GOING NO. MO. DAG	
Duest three [ms]	0	700	200	400		
9 e 1 dex	1 *	2 "	1 *	1 *	A PAI PARKE RUBBE BANK WARRED	
Atlon	Next Index	Next Index	900	Not Inco:		
	Copy Pasts	Copy Paste	Copy Peste	Copy Pacte	0 0 0 0 0 0 0 0 0 0	
				1	DR 3 MODE HAS 100 1014	
	Index 4	Index 5	Index 6	Index /	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
Index Type	Relative v	Beldine v	Relative v	Itelative v	/DHK	
Detore [UL]	100000	100000	100000	100000	06 (a) 06 (a) 06 (a) 08 (b) 08	
debety [UU/s]	10070	100000	100000	1000000		
Acceleration (UU/s/3)	1001200	.000000	100000	1000000	► cover ■ stor avec	
Deceleration (IIII/402)	10030	100000	1000300	1000000	€ thick did C thicked	
Registration (Oktober [14.]	10000	100000	100000	100000	A parama	
Dogisladia: Whody [UUS]	1000000	.000000	1000300	1000000		
Regred Count	1	1	1	1		
Dwell (me [ms]	200	200	200	200		
Ned Index	1	1 "	1 "	1 "		
Action	Ned Index v	fixed limited v	Ned Inde: v	Med Index v		
	Figer Biele	Topy Refe	Figer Partie	Copy Rade		
Sevo Index as File	Pared Discoving	m File 💮 🐞 Sa	ve Index to EEFROM	C Retresh Index Data		
■ Process Inside New						

Indexer Setting Screen (L7P/L7C series only)



Object Dictionary Screen

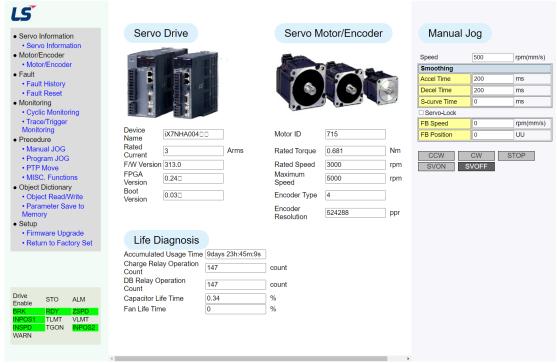


LS Electric AC Servo Systems

Drive Software, continued

Modbus TCP Webserver (iX7NH Series)

When using Modbus TCP as the control mode, the drive can generate a built-in webserver to accomplish most of the tasks Drive CM is used for (configuration, jog, fault monitoring/reset, firmware upgrade, etc.). Setting the drive DIP swtiches to Node 99 enables Modbus TCP and enables the webserver. If your IT security policy does not allow webservers on your network, the webserver can be disabled by using Node 98 (enables Modbus TCP with no webserver). The Node 98 functionality is available in firmware versions 1.15 and above.



Example Webserver Screen



L7C/L7P Series AC Servo Systems

Accessories

CN1 Accessories

For L7x series drives, two methods are available for creating I/O connections.

Option 1:

Terminal blocks + cables:

- APC-VSCN1T-AD
- APC-VSCN1T01-AD
- APC-VSCN1T02-AD

APC-VSCN1T terminals ship with a universal labeling strip (A1-A25, B1-B25). A labeling template with designations specifically for the L7x drive can be downloaded from any of the drive pages or the terminal block page (www.automationdirect.com/pn/apc-vscn1t-ad).



APC-VSCN1T-AD

Option 2:

Flying lead cables:

- APC-CN101A-AD
- APC-CN102A-AD
- APC-CN103A-AD



APC-CN101A-AD



NOTE: For L7C drives, do not use APC-VSCN1T(xx)-AD feedthrough terminal block if using PLC/Drive serial communication. Communication errors may occur due to disconnects in cable shields. Use APC-CN10xA-AD flying lead cables.

Part Number	Price	Description	Cable Length	Drawing	Compatible Drives
APC-VSCN1T-AD	\$75.00	LO Electric ONA feedalless als	0.5 m [1.6 ft]	PDF	
APC-VSCN1T01-AD	\$84.00	LS Electric CN1 feedthrough Ferminal block, 50-pole, DIN Fail mount	1.0 m [3.2 ft]	PDF	
APC-VSCN1T02-AD	\$92.00	raii mount	2.0 m [6.5 ft]	PDF	All L7C and L7P drives
APC-CN101A-AD	\$46.00		1.0 m [3.2 ft]	PDF	All L/C and L/F drives
APC-CN102A-AD	\$50.00	S Electric control cable, 50- bin connector to pigtail.	2.0 m [6.5 ft]	PDF	
APC-CN103A-AD	\$55.00		3.0 m [9.8 ft]	<u>PDF</u>	

Accessories

L7C Terminal Assignment Table



CAUTION: This terminal assignment table is for use with L7C drives ONLY. Using this table with non-L7C series drives could damage your equipment as terminal assignments are different for each drive series.

APC-VSCN1T-AD

		_
1		
(A1)	2	
3	(B1)	((A)
(A2)	4	
5	(B2)	· ·
(A3)	6	
7	(B3)	
(A4)	8	
9	(B4)	
(A5)	10	
11	(B5)	
(A6)	12	
13	(B6)	
(A7)	14	
15	(B7)	
(A8)	16	
17	(B8)	
(A9)	18	
19	(B9)	
(A10)	20	
21	(B10)	
(A11)	22	
23	(B11)	
(A12)	24	
25	(B12)	
(A13)	26	
27	(B13)	
(A14) 29	28 (D14)	
(A15)	(B14)	
31	(B15)	
(A16)	32	
33	(B16)	
(A17)	34	
35	(B17)	
(A18)	36	
37	(B18)	
(A19)	38	
39	(B19)	
(A20)	40	
41	(B20)	
(A21)	42	
43	(B21)	
(A22)	44	
45	(B22)	
(A23) 47	46	
(A24)	(B23) 48	
49	(B24)	(\Box)
(A25)	50	
(1,23)	(B25)	
	,,	

You can download a printable terminal label at https://www.automationdirect.com/pn/APC-VSCN1T-AD

	L7C Drive Terminal Assignments						
		e termina	i Assiyii				
Terminal	Drive I/O Pin/Wire #	Description	Wire Color	Stripe Color	Number of Stripes		
A1	1	AI-1 (TRQCOM)	Orange	Black	1		
B1	2	TXD+	Orange	Red	1		
A2	3	TXD-	Orange	Black	2		
B2	4	Z0	Orange	Red	2		
A3	5	/Z0	Orange	Black	3		
B3	6	RXD+	Orange	Red	3		
A4	7	RXD-	Orange	Black	4		
B4	8	A-GND	Orange	Red	4		
A5	9	PF+	Orange	Black	5		
B5	10	PF-	Orange	Red	5		
A6	11	PR+	Yellow	Black	1		
B6	12	PR-	Yellow	Red	1		
A7	13	N/C	Yellow	Black	2		
B7	14	DO-8	Yellow	Red	2		
A8	15	DO-7	Yellow	Black	3		
B8	16	DO-6	Yellow	Red	3		
A9	17	DI-5	Yellow	Black	4		
B9	18	DI-9	Yellow	Red	4		
A10	19	DI-8	Yellow	Black	5		
B10	20	DI-7	Yellow	Red	5		
A11	21	DI-4	Gray	Black	1		
B11	22	DI-3	Gray	Red	1		
A12	23	DI-2	Gray	Black	2		
B12	24	DO-GND24	Gray	Red	2		
A13	25	DO-GND24	Gray	Black	3		
B13	26	N/C	Gray	Red	3		
A14	27	AI-2 (SPDCOM)	Gray	Black	4		
B14	28	N/C	Gray	Red	4		
A15	29	N/C	Gray	Black	5		
B15	30	В0	Gray	Red	5		
A16	31	/B0	White	Black	1		
B16	32	AO	White	Red	1		
A17	33	/AO	White	Black	2		
B17	34	+12V	White	Red	2		
A18	35	-12V	White	Black	3		
B18	36	ENC SG	White	Red	3		
A19	37	N/C	White	Black	4		
B19	38	DO-1+	White	Red	4		
A20	39	DO-1-	White	Black	5		
B20	40	DO-2+	White	Red	5		
A21	41	DO-2-	Pink	Black	1		
B21	42	N/C	Pink	Red	1		
A22	43	DO-3	Pink	Black	2		
B22	44	DO-4	Pink	Red	2		
A23	45	DO-5	Pink	Black	3		
B23	46	DI-6	Pink	Red	3		
A24	47	DI-1	Pink	Black	4		
B24	48	DI-A	Pink	Red	4		
A25	49	PULCOM	Pink	Black	5		
B25	50	+24v	Pink	Red	5		

Accessories

L7P Terminal Assignment Table



CAUTION: This terminal assignment table is for use with L7P drives ONLY. Using this table with non-L7P series drives could damage your equipment as terminal assignments are different for each drive series.

APC-VSCN1T-AD

1		
(A1)	2	
3	(B1)	$ \langle \psi \rangle$
(A2)	4	1 4
5	(B2)	
(A3)	6	
7	(B3)	
(A4)	8	
9	(B4)	
(A5)	10	
11	(B5)	
(A6)	12	
13	(B6)	l —
(A7)	14 (D7)	
15	(B7)	
(A8)	16 (PO)	
(A9)	(B8) 18	
19	(B9)	
(A10)	20	
21	(B10)	
(A11)	22	
23	(B11)	
(A12)	24	
25	(B12)	
(A13)	26	
27	(B13)	
(A14)	28	
29	(B14)	
(A15)	30	
31	(B15)	
(A16)	32	
33	(B16)	
(A17)	34	
35	(B17)	
(A18)	36	
37	(B18)	
(A19)	38	
39	(B19)	
(A20)	40	
41	(B20)	
(A21)	42	
43	(B21)	
(A22)	44 (B22)	
45 (A22)	(B22)	
(A23)	46	
(A24)	(B23) 48	
49	(B24)	
(A25)	50	
(A23)	(B25)	
	(023)	

You can download a printable terminal label at https://www.automationdirect.com/pn/APC-VSCN1T-AD

	L7P Driv	e Termina	Assign	ments				
Terminal	Drive I/O Pin/ Wire #	Description	Wire Color	Stripe Color	Number of Stripes			
A1	1	AO	Orange	Black	1			
B1	2	/AO	Orange	Red	1			
A2	3	ВО	Orange	Black	2			
B2	4	/BO	Orange	Red	2			
A3	5	ZO	Orange	Black	3			
В3	6	/ZO	Orange	Red	3			
A4	7	A-TLMT	Orange	Black	4			
B4	8	AGND	Orange	Red	4			
A5	9	A-OVR	Orange	Black	5			
B5	10	AGND	Orange	Red	5			
A6	11	+24V	Yellow	Black	1			
В6	12	DI-1	Yellow	Red	1			
A7	13	DI-2	Yellow	Black	2			
В7	14	DI-3	Yellow	Red	2			
A8	15	DI-4	Yellow	Black	3			
B8	16	DI-5	Yellow	Red	3			
A9	17	DI-6	Yellow	Black	4			
В9	18	DI-7	Yellow	Red	4			
A10	19	DI-8	Yellow	Black	5			
B10	20	N/C	Yellow	Red	5			
A11	21	+24v	Gray	Black	1			
B11	22	DI-9	Gray	Red	1			
A12	23	DI-10	Gray	Black	2			
B12	24	DI-11	Gray	Red	2			
A13	25	DI-12	Gray	Black	3			
B13	26	DI-13	Gray	Red	3			
A14	27	DI-14	Gray	Black	4			
B14	28	DI-15	Gray	Red	4			
A15	29	DI-16	Gray	Black	5			
B15	30	PULCOM 24V pwr	Gray	Red	5			
A16	31	input PF+	White	Black	1			
B16	32	PF-	White	Red	1			
A17	33	PR+	White	Black	2			
B17	34	PR-	White	Red	2			
A18	35	DO-1+	White	Black	3			
B18	36	DO-1-	White	Red	3			
A19	37	DO-2+	White	Black	4			
B19	38	DO-2-	White	Red	4			
A20	39	DO-3+	White	Black	5			
B20	40	DO-3-	White	Red	5			
A21	41	DO-4+	Pink	Black	1			
B21	42	DO-4-	Pink	Red	1			
A22	43	DO-5+	Pink	Black	2			
B22	44	DO-5-	Pink	Red	2			
A23	45	DO-6+	Pink	Black	3			
B23	46	DO-6-	Pink	Red	3			
A24	47	DO-7+	Pink	Black	4			
B24	48	DO-7-	Pink	Red	4			
A25	49	DO-8+	Pink	Black	5			
B25	50	DO-8-	Pink	Red	5			
			-					



Accessories

CN1 Accessories

For iX7NH series drives, two methods are available for creating I/O connections.

Option 1:

Terminal blocks + cables:

- APCS-L7NCN1T-AD
- APCS-L7NCN1T01-AD
- APCS-L7NCN1T015-AD
- APCS-L7NCN1T02-AD

APCS-L7NCN1T terminals ship with a universal labeling strip (A1-A10, B1-B10). A labeling template with designations specifically for the i7X drive can be downloaded from any of the drive pages or the terminal block page (www.automationdirect.com/pn/apcs-l7ncn1t-ad).

Option 2:

Flying lead cables:

- APCS-CN101A-AD
- APCS-CN102A-AD
- APCS-CN103A-AD



APCS-L7NCN1T-AD



APCS-CN101A-AD

Part Number	Price	Description	Cable Length	Drawing	Compatible Drives
APCS-L7NCN1T-AD	\$56.00		0.5 m [1.6 ft]	PDF	
APCS-L7NCN1T01-AD	\$59.00	LS Electric CN1 feedthrough terminal block, 20-pole, DIN	1.0 m [3.2 ft]	PDF	
APCS-L7NCN1T015-AD	\$61.00	rail mount. For use with all LS Electric iX7 series drives.	1.5 m [4.9 ft]	PDF	
APCS-L7NCN1T02-AD	\$63.00		2.0 m [6.5 ft]	PDF	All iX7NH drives
APCS-CN101A-AD	\$39.00		1.0 m [3.2 ft]	PDF	
APCS-CN102A-AD	\$43.00	LS Electric CN1 control cable, 20-pin connector to pigtail.	2.0 m [6.5 ft]	PDF	
APCS-CN103A-AD	\$45.00	pigtaii.	3.0 m [9.8 ft]	<u>PDF</u>	



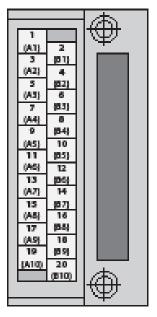
Accessories

iX7NH Terminal Assignment Table



CAUTION: This terminal assignment table is for use with iX7NH drives ONLY. Using this table with non-iX7NH series drives could damage your equipment as terminal assignments are different for each drive series.

APCS-LINCHTITIES-AD



You can download a printable terminal label at https://www.automationdirect.com/pn/APCS-L7NCN1T-AD

	iX7NH Drive Terminal Assignments							
Terminal	Drive I/O Pin/Wire #	Description	Wire Color	Stripe Color	Number of Stripes			
A1	1	DO1	Yellow	Black	1			
B1	2	DOCOM	Yellow	Red	1			
A2	3	DO2	Yellow	Black	2			
B2	4	DO3	Yellow	Red	2			
A3	5	AGND	Yellow	Black	3			
В3	6	+24V	Yellow	Red	3			
A4	7	DI3	Yellow	Black	4			
B4	8	DI4	Yellow	Red	4			
A5	9	AO	Yellow	Black	5			
B5	10	/AO	Yellow	Red	5			
A6	11	DI1	White	Black	1			
В6	12	DI2	White	Red	1			
A7	13	DI5	White	Black	2			
B7	14	DI6	White	Red	2			
A8	15	A-TLMT	White	Black	3			
B8	16	GND	White	Red	3			
A9	17	ZO	White	Black	4			
В9	18	/ZO	White	Red	4			
A10	19	ВО	White	Black	5			
B10	20	/BO	White	Red	5			



Accessories, continued

NOTE: These parts available for sale to North American locations only

iX7NH System STO Cables

Use these pre-made factory cables to easily connect the drive STO connector to a safety relay.

Part Number	Price	Length	Description	Drawing	Compatible Motors
APCS-ST003A-AD	\$40.00	0.3 m [1ft]	LS Electric STO cable,	PDF	
APCS-STO10A-AD	\$42.00	1m [3.2 ft]	6-pin connector to pigtail,	PDF	All iX7NH series drives
APCS-STO30A-AD	\$45.00	3m [9.8 ft]		PDF	



APCS-STO series cable

iX7NH STO Bypass Connector

Replacement STO bypass connector. Note that each drive ships with an APCS-CN6K bypass connector included - this is only needed as a replacement.

Part Number	Price	Description	Drawing	Compatible Motors
APCS-CN6K-AD	\$19.00	LS Electric STO connector, replacement, 6-pin. For use with all LS Electric iX7 series drives.	<u>PDF</u>	All iX7NH series drives



APCS-CN6K-AD



LS ELECTRIC LS Electric AC Servo Systems

Accessories, continued

NOTE: These parts available for sale to North American locations only

L7C/L7P/iX7NH System Motor Encoder Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
APCS-EN03ES-AD	\$48.00		3m [9.8 ft]		PDF	
APCS-EN05ES-AD	\$58.00	N	5m [16.4 ft]		PDF	
APCS-EN10ES-AD	\$67.00	IN	10m [32.8 ft]		PDF	ADMC
APCS-EN20ES-AD	\$79.00		20m [65.6 ft]	24AWG	PDF	APMC motors with 17-bit incremental
APCS-EF03ES-AD	\$70.00		3m [9.8 ft]	Z4AVVG	PDF	encoders (AYK/AYK2 motors)
APCS-EF05ES-AD	\$83.00	Υ	5m [16.4 ft]		PDF	(ATNATAZ IIIOIOIS)
APCS-EF10ES-AD	\$116.00	ı	10m [32.8 ft]		PDF	
APCS-EF20ES-AD	\$188.00		20m [65.6 ft]		PDF	
APCS-EN03ES1-AD	\$79.00		3m [9.8 ft]		PDF	FBL/FCL series motors with 19-bit encoders
APCS-EN05ES1-AD	\$83.00	N	5m [16.4 ft]		PDF	
APCS-EN10ES1-AD	\$96.00	IN	10m [32.8 ft]		PDF	
APCS-EN20ES1-AD	\$120.00		20m [65.6 ft]		PDF	
APCS-EF03ES1-AD	\$99.00		3m [9.8 ft]		PDF	
APCS-EF05ES1-AD	\$117.00	Υ	5m [16.4 ft]		PDF	
APCS-EF10ES1-AD	\$159.00	'	10m [32.8 ft]		PDF	
APCS-EF20ES1-AD	\$244.00		20m [65.6 ft]	24AWG	PDF	
APCS-EN03DS1-AD	\$83.00		3m [9.8 ft]	Z4AVVG	PDF	
APCS-EN05DS1-AD	\$88.00	N	5m [16.4 ft]		PDF	
APCS-EN10DS1-AD	\$99.00	IN IN	10m [32.8 ft]		PDF	
APCS-EN20DS1-AD	\$123.00		20m [65.6 ft]		PDF	APM-FE/APM-FF
APCS-EF03DS1-AD	\$104.00		3m [9.8 ft]		PDF	series motors
APCS-EF05DS1-AD	\$120.00	Υ	5m [16.4 ft]		PDF	
APCS-EF10DS1-AD	\$159.00	Y	10m [32.8 ft]		PDF	
APCS-EF20DS1-AD	\$246.00		20m [65.6 ft]		PDF	



APCS-EN series encoder cable



APCS-ENxxxES1 series encoder cable



L7P/iX7NH System Encoder Accessories

Part Number	Price	Description	Compatible Drives
APC-EF00BS-AD	\$20.00	17-pin motor encoder connector.	APM-FE and APM- FF series motors
APCS-BATT36-AD	\$36.00	Encoder battery. One (1) AA ER6V lithium battery with extended leads and an encoder cable connector.	All LS Electric motors with 19-bit encoders

APC-EF00BS-AD



APCS-BATT36-AD



LS ELECTRIC LS Electric AC Servo Systems

Accessories, continued

NOTE: These parts available for sale to North American locations only

L7C/L7P/iX7NH System Motor Brake Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
APCS-BN03QS-AD	\$52.00		3m [9.8 ft]		PDF	
APCS-BN05QS-AD	\$55.00	N	5m [16.4 ft]		PDF	
APCS-BN10QS-AD	\$61.00	IN IN	10m [32.8 ft]		PDF	APMC FBL/FCL brake motors (100W – 1kW)
APCS-BN20QS-AD	\$74.00		20m [65.6 ft]	18AWG	PDF	
APCS-BF03QS-AD	\$58.00		3m [9.8 ft]	TOAVVG	PDF	
APCS-BF05QS-AD	\$63.00	V	5m [16.4 ft]		PDF	
APCS-BF10QS-AD	\$79.00	Y	10m [32.8 ft]		PDF	
APCS-BF20QS-AD	\$108.00		20m [65.6 ft]		<u>PDF</u>	



APCS-BN series brake cable



iX7NH System Non-Brake Motor Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
APCS-PN03LSX-AD	\$48.00		3m [9.8 ft]		<u>PDF</u>	
APCS-PN05LSX-AD	\$53.00	N	5m [16.4 ft]		PDF	
APCS-PN10LSX-AD	\$65.00	IN IN	10m [32.8 ft]		PDF	
APCS-PN20LSX-AD	\$94.00		20m [65.6 ft]		PDF	FBL/FCL series
APCS-PF03LSX-AD	\$55.00		3m [9.8 ft]		PDF	motors
APCS-PF05LSX-AD	\$65.00	Υ	5m [16.4 ft]		<u>PDF</u>	
APCS-PF10LSX-AD	\$93.00	ľ	10m [32.8 ft]		PDF	
APCS-PF20LSX-AD	\$146.00		20m [65.6 ft]		<u>PDF</u>	
APCS-PN03HSX1-AD	\$48.00		3m [9.8 ft]		<u>PDF</u>	
APCS-PN05HSX1-AD	\$55.00	N	5m [16.4 ft]		<u>PDF</u>	
APCS-PN10HSX1-AD	\$72.00	IN IN	10m [32.8 ft]		<u>PDF</u>	
APCS-PN20HSX1-AD	\$108.00		20m [65.6 ft]		PDF	APM-FE15A series
APCS-PF03HSX1-AD	\$56.00		3m [9.8 ft]		<u>PDF</u>	motors without brake
APCS-PF05HSX1-AD	\$68.00	Υ	5m [16.4 ft]		PDF	
APCS-PF10HSX1-AD	\$100.00	'	10m [32.8 ft]		<u>PDF</u>	
APCS-PF20HSX1-AD	\$158.00		20m [65.6 ft]		<u>PDF</u>	
APCS-PN03HSX-AD	\$53.00		3m [9.8 ft]		PDF	
APCS-PN05HSX-AD	\$63.00	N	5m [16.4 ft]		<u>PDF</u>	
APCS-PN10HSX-AD	\$89.00	l IN	10m [32.8 ft]		PDF	
APCS-PN20HSX-AD	\$139.00		20m [65.6 ft]		PDF	APM-FE16D and APM-FE22D series
APCS-PF03HSX-AD	\$68.00		3m [9.8 ft]		<u>PDF</u>	motors without brake
APCS-PF05HSX-AD	\$89.00	Υ	5m [16.4 ft]		<u>PDF</u>	
APCS-PF10HSX-AD	\$139.00	'	10m [32.8 ft]		<u>PDF</u>	
APCS-PF20HSX-AD	\$241.00		20m [65.6 ft]		PDF	
APCS-PN03ISX-AD	\$58.00		3m [9.8 ft]		<u>PDF</u>	
APCS-PN05ISX-AD	\$68.00	N	5m [16.4 ft]		PDF	
APCS-PN10ISX-AD	\$94.00	IN .	10m [32.8 ft]		<u>PDF</u>	
APCS-PN20ISX-AD	\$144.00		20m [65.6 ft]		<u>PDF</u>	APM-FF35D motors
APCS-PF03ISX-AD	\$75.00		3m [9.8 ft]		<u>PDF</u>	without brake
APCS-PF05ISX-AD	\$96.00	Y	5m [16.4 ft]		<u>PDF</u>	
APCS-PF10ISX-AD	\$150.00	'	10m [32.8 ft]		<u>PDF</u>	
APCS-PF20ISX-AD	\$256.00		20m [65.6 ft]		<u>PDF</u>	

NOTE: These parts available for sale to North American locations only



APCS-PxxLSX series power cable



APCS-PxxHSX1 series power cable



APCS-PxxHSX series power cable



Accessories, continued

iX7NH System Brake Motor Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors			
Note: For FBL/FCL 100W–1kW motors with brake, use the power cables on the previous page AND separate brake cable APCS-BxxxQS-AD from page page tMNC-259. This is for FBL/FCL motors only. FE and FF motors have brake wiring incorporated into the power cable (below).									
APCS-PN03NBX1-AD	\$58.00		3m [9.8 ft]		PDF				
APCS-PN05NBX1-AD	\$68.00	N	5m [16.4 ft]		PDF				
APCS-PN10NBX1-AD	\$94.00	IN IN	10m [32.8 ft]		PDF				
APCS-PN20NBX1-AD	\$144.00		20m [65.6 ft]		PDF	APM-FE15A series			
APCS-PF03NBX1-AD	\$72.00		3m [9.8 ft]		PDF	motors with brakes			
APCS-PF05NBX1-AD	\$91.00	Y	5m [16.4 ft]		PDF				
APCS-PF10NBX1-AD	\$139.00	I	10m [32.8 ft]		PDF				
APCS-PF20NBX1-AD	\$237.00		20m [65.6 ft]		<u>PDF</u>				
APCS-PN03NBX-AD	\$62.00		3m [9.8 ft]		PDF				
APCS-PN05NBX-AD	\$74.00	N	5m [16.4 ft]		PDF				
APCS-PN10NBX-AD	\$103.00	IN IN	10m [32.8 ft]		PDF				
APCS-PN20NBX-AD	\$165.00		20m [65.6 ft]		PDF	APM-FE16D and APM-FE22D series			
APCS-PF03NBX-AD	\$81.00		3m [9.8 ft]		PDF	motors with brakes			
APCS-PF05NBX-AD	\$106.00	Y	5m [16.4 ft]		PDF				
APCS-PF10NBX-AD	\$165.00	Ţ	10m [32.8 ft]		PDF				
APCS-PF20NBX-AD	\$293.00		20m [65.6 ft]		PDF				
APCS-PN03PBX-AD	\$70.00		3m [9.8 ft]		PDF				
APCS-PN05PBX-AD	\$82.00	Υ	5m [16.4 ft]		PDF				
APCS-PN10PBX-AD	\$117.00	I	10m [32.8 ft]		PDF				
APCS-PN20PBX-AD	\$184.00		20m [65.6 ft]		PDF	APM-FF35D series			
APCS-PF03PBX-AD	\$89.00		3m [9.8 ft]		<u>PDF</u>	motors with brakes			
APCS-PF05PBX-AD	\$117.00	N	5m [16.4 ft]		<u>PDF</u>				
APCS-PF10PBX-AD	\$182.00	IN	10m [32.8 ft]		<u>PDF</u>				
APCS-PF20PBX-AD	\$315.00		20m [65.6 ft]		<u>PDF</u>				





APCS-PxxNBX series power cable



APCS-PxxPBX series power cable



Accessories, continued

NOTE: These parts available for sale to North American locations only

L7C System Motor Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
APCS-PN03LSC-AD	\$40.00		3m [9.8 ft]		PDF	
APCS-PN05LSC-AD	\$48.00	N	5m [16.4 ft]		PDF	
APCS-PN10LSC-AD	\$62.00	IN	10m [32.8 ft]		PDF	APMC FBL/FCL motors (100W – 1kW) used with L7C drives
APCS-PN20LSC-AD	\$85.00		20m [65.6 ft]	18AWG	PDF	
APCS-PF03LSC-AD	\$52.00		3m [9.8 ft]	TOAVVG	PDF	
APCS-PF05LSC-AD	\$68.00		5m [16.4 ft]		PDF	
APCS-PF10LSC-AD	\$96.00	Y	10m [32.8 ft]		PDF	
APCS-PF20LSC-AD	\$151.00		20m [65.6 ft]		<u>PDF</u>	



APCS-PN series motor cable



L7P System Non-Brake Motor Power Cables

L7P System No	ni-brake i		wer Cabi	E2		Compatible
Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
APCS-PN03LS-AD	\$42.00		3m [9.8 ft]		PDF	
APCS-PN05LS-AD	\$46.00	N.	5m [16.4 ft]		PDF	
APCS-PN10LS-AD	\$57.00	N	10m [32.8 ft]		PDF	
APCS-PN20LS-AD	\$80.00		20m [65.6 ft]	400000	PDF	FBL/FCL series
APCS-PF03LS-AD	\$53.00		3m [9.8 ft]	18AWG	PDF	motors
APCS-PF05LS-AD	\$62.00	Y	5m [16.4 ft]		PDF	
APCS-PF10LS-AD	\$90.00	Y	10m [32.8 ft]		PDF	
APCS-PF20LS-AD	\$145.00		20m [65.6 ft]		PDF	
APCS-PN03HS-AD	\$45.00		3m [9.8 ft]		PDF	
APCS-PN05HS-AD	\$54.00	N	5m [16.4 ft]		PDF	
APCS-PN10HS-AD	\$76.00	IN .	10m [32.8 ft]		PDF	
APCS-PN20HS-AD	\$119.00		20m [65.6 ft]		PDF	APM-FE series
<u>APCS-PF03HS-AD</u>	\$62.00		3m [9.8 ft]		PDF	motors without brake
APCS-PF05HS-AD	\$80.00	Υ	5m [16.4 ft]		PDF	
APCS-PF10HS-AD	\$127.00	'	10m [32.8 ft]		PDF	
APCS-PF20HS-AD	\$222.00		20m [65.6 ft]	14AWG	PDF	
APCS-PN03IS-AD	\$61.00		3m [9.8 ft]	14700	<u>PDF</u>	
APCS-PN05IS-AD	\$77.00	N	5m [16.4 ft]		<u>PDF</u>	230VAC APM-FF35D and 460VAC APM- FFP35D motors without brakes
APCS-PN10IS-AD	\$119.00	IN .	10m [32.8 ft]		PDF	
APCS-PN20IS-AD	\$199.00		20m [65.6 ft]		PDF	
APCS-PF03IS-AD	\$77.00		3m [9.8 ft]		PDF	
APCS-PF05IS-AD	\$103.00	Υ	5m [16.4 ft]		PDF	
APCS-PF10IS-AD	\$169.00		10m [32.8 ft]		PDF	
APCS-PF20IS-AD	\$305.00		20m [65.6 ft]		<u>PDF</u>	
APCS-PN03JS-AD	\$68.00		3m [9.8 ft]		PDF	
APCS-PN05JS-AD	\$90.00	N	5m [16.4 ft]		PDF	
APCS-PN10JS-AD	\$139.00		10m [32.8 ft]	_	PDF	
APCS-PN20JS-AD	\$258.00		20m [65.6 ft]	10AWG	PDF	230VAC APM-FF55D
APCS-PF03JS-AD	\$97.00		3m [9.8 ft]		<u>PDF</u>	motors without brake
APCS-PF05JS-AD	\$137.00	Υ	5m [16.4 ft]		PDF	
APCS-PF10JS-AD	\$237.00		10m [32.8 ft]	_	PDF	
APCS-PF20JS-AD	\$440.00		20m [65.6 ft]		PDF	
APCS-PF03JS1-AD	\$82.00		3m [9.8 ft]		PDF	460VAC APM-
APCS-PF05JS1-AD	\$111.00	Υ	5m [16.4 ft]	12AWG	PDF	FFP55D and APM-
APCS-PF10JS1-AD	\$186.00		10m [32.8 ft]	_	PDF	FFP75D motors without brakes
APCS-PF20JS1-AD	\$339.00		20m [65.6 ft]		PDF	
APCS-PN03JS2-AD	\$117.00		3m [9.8 ft]	-	PDF	
APCS-PN05JS2-AD	\$163.00	N	5m [16.4 ft]	_	<u>PDF</u>	
APCS-PN10JS2-AD	\$276.00		10m [32.8 ft]	-	PDF	
APCS-PN20JS2-AD	\$499.00		20m [65.6 ft]	8AWG	<u>PDF</u>	230VAC APM-FF75D motors without brake
APCS-PF03JS2-AD	\$169.00		3m [9.8 ft]	_	PDF	motors without brake
APCS-PF05JS2-AD	\$247.00	Υ	5m [16.4 ft]	-	PDF PDF	
APCS-PF10JS2-AD	\$439.00		10m [32.8 ft]	-	PDF	
APCS-PF20JS2-AD	\$824.00		20m [65.6 ft]		PDF	

NOTE: These parts available for sale to North American locations only



APCS-PxxLS series power cable



APCS-PxxHS series power cable



APCS-PxxIS series power cable



APCS-PxxJS series power cable



Accessories, continued

L7P System Brake Motor Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Compatible Motors
Note: For FBL/FCL 100W- spearate brake cable APC brake wiring incorporated	S-BxxxQS-AD f	rom page tMNC-				
APCS-PN03NB-AD	\$49.00		3m [9.8 ft]		PDF	
APCS-PN05NB-AD	\$58.00		5m [16.4 ft]		PDF	
APCS-PN10NB-AD	\$84.00	N	10m [32.8 ft]		PDF	•
APCS-PN20NB-AD	\$137.00		20m [65.6 ft]		PDF	230VAC and 460
APCS-PF03NB-AD	\$71.00		3m [9.8 ft]		PDF	VAC APM-FE series motors with brakes
APCS-PF05NB-AD	\$95.00		5m [16.4 ft]		PDF	
APCS-PF10NB-AD	\$153.00	Y	10m [32.8 ft]		PDF	
APCS-PF20NB-AD	\$274.00		20m [65.6 ft]		PDF	
APCS-PN03PB-AD	\$69.00		3m [9.8 ft]	14AWG	PDF	
APCS-PN05PB-AD	\$87.00		5m [16.4 ft]		PDF	
APCS-PN10PB-AD	\$133.00	N	10m [32.8 ft]		PDF	
APCS-PN20PB-AD	\$229.00		20m [65.6 ft]		PDF	230VAC APM-FF35D and 460VAC APM-
APCS-PF03PB-AD	\$88.00		3m [9.8 ft]		PDF	FFP35D motors with brakes
APCS-PF05PB-AD	\$120.00	V	5m [16.4 ft]		PDF	
APCS-PF10PB-AD	\$198.00	Y	10m [32.8 ft]		PDF	
APCS-PF20PB-AD	\$359.00		20m [65.6 ft]		PDF	
APCS-PN03LB-AD	\$77.00		3m [9.8 ft]		PDF	
APCS-PN05LB-AD	\$99.00	M	5m [16.4 ft]		PDF	230VAC APM-FF55D motors with brake
APCS-PN10LB-AD	\$153.00	N	10m [32.8 ft]		PDF	
APCS-PN20LB-AD	\$265.00		20m [65.6 ft]	0.000	PDF	
APCS-PF03LB-AD	\$114.00		3m [9.8 ft]	8AWG	PDF	
APCS-PF05LB-AD	\$160.00	V	5m [16.4 ft]		PDF	
APCS-PF10LB-AD	\$275.00	Y	10m [32.8 ft]		PDF	
APCS-PF20LB-AD	\$510.00		20m [65.6 ft]		PDF	
APCS-PF03LB1-AD	\$95.00		3m [9.8 ft]		PDF	400) /4 0 4 5 4
APCS-PF05LB1-AD	\$130.00	V	5m [16.4 ft]	400000	PDF	460VAC APM- FFP55D and APM-
APCS-PF10LB1-AD	\$220.00	Y	10m [32.8 ft]	12AWG	PDF	FFP75D motors with
APCS-PF20LB1-AD	\$400.00		20m [65.6 ft]		PDF	brakes
APCS-PN03LB2-AD	\$130.00		3m [9.8 ft]		PDF	
APCS-PN05LB2-AD	\$177.00	M	5m [16.4 ft]		PDF	
APCS-PN10LB2-AD	\$300.00	N	10m [32.8 ft]		PDF	
APCS-PN20LB2-AD	\$540.00		20m [65.6 ft]	0.014/0	PDF	230VAC APM-FF75D
APCS-PF03LB2-AD	\$187.00		3m [9.8 ft]	8AWG	PDF	motors with brake
APCS-PF05LB2-AD	\$272.00	V	5m [16.4 ft]		<u>PDF</u>	
APCS-PF10LB2-AD	\$479.00	Y	10m [32.8 ft]		<u>PDF</u>	
APCS-PF20LB2-AD	\$906.00		20m [65.6 ft]		PDF	



APCS-PxxNB series power cable



APCS-PxxPB series power cable



APCS-PxxLB series power cable



LS Drive System Accessories

Accessories, continued

LS Drive System Replacement Connectors

Part Number	Price	Description	Compatible Drives	Image
<u>5452573</u>	\$6.50	AutomationDirect replacement drive power connector.	All L7C drives	**************************************
<u>APC-CN1NNA-AD</u>	\$17.50	LS solder-type CN1 50-pin Electric I/O connector.	All L7C and L7P series drives	
APC-CN2NNA-AD	\$15.00	LS Electric I/O connector, replacement, 20-pin.	All iX7NH series drives	
APC-CN3NNA-AD	\$17.50	LS Electric solder-type CN2 14-pin drive encoder connector.	All L7C, L7P, and iX7NH series drives	
APCS-CN6K-AD	\$19.00	LS Electric STO connector, replacement, 6-pin. For use with all LS Electric iX7 series drives.	All iX7NH series drives	
IX7-CON-A	\$19.00	AutomationDirect drive power connector, replacement, 11-pin.	iX7NH series drives, 400W, 750W, and 1kW	
IX7-CON-B	\$19.00	AutomationDirect drive power connector for motor power, replacement, 4-pin.	iX7NH series drives, 400W, 750W, and 1kW	222
IX7-CON-C	\$9.00	AutomationDirect drive power connector release, replacement.	iX7NH series drives, 400W, 750W, and 1kW	
<u>IX7-CON-D</u>	\$19.00	AutomationDirect drive power connector for motor power, replacement, 4-pin	iX7NH series drives, 2kW and 3.5 kW	DOP. A
IX7-CON-E	\$19.00	AutomationDirect drive control power connector, replacement, 5-pin.	iX7NH series drives, 2kW and 3.5 kW	BOC.BC
IX7-CON-F	\$19.00	AutomationDirect drive main power connector, replacement, 6-pin.	iX7NH series drives, 2kW and 3.5 kW	SAGE AG
L7P-CON-A	\$15.00	Replacement 11-pin drive power connector.	L7PA series 230VAC 400W and 1kW drives	THE THE PARTY OF T
L7P-CON-B	\$8.00	Replacement 3-pin drive power connector.	L7PA series 230VAC 400W and 1kW drives	
		Continued on nex	t page	

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Motion Control

LS Drive System Accessories

Accessories, continued

LS Drive System Replacement Connectors, continued

Part Number	Price	Description	Compatible Drives	Image
<u>L7P-CON-C</u>	\$20.00	Replacement 11-pin drive power connector.	L7PB series 460VAC 1kW drives, all L7P series 2kW and 3.5 kW drives	The state of the s
<u>L7P-CON-D</u>	\$7.50	Replacement 3-pin drive power connector.	L7PB series 460VAC 1kW drives, all L7P series 2kW and 3.5 kW drives	
<u>L7P-CON-E</u>	\$0.50	Drive analog monitor crimp pins (24-48 AWG), package of 5.	All L7P and iX7NH drives. Requires L7P-CON-F	ATTEN .
L7P-CON-F	\$2.00	Drive analog monitor 4-pin crimp connector.	All L7P and iX7NH drives. Requires L7P-CON-E	
<u>L7P-CON-G</u>	\$2.00	Drive analog monitor 4-pin IDC connector (26AWG).	All L7P and iX7NH series drives	

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LS Electric AC Servo Systems

Accessories, continued

L7C/L7P/iX7NH System Braking Resistors

Use external braking resistors to provide additional regenerative capacity and to dissipate heat away from the servo drive.

Part Number	Price	Description	Drawing	Compatible Drives
<u>APCS-140R50-AD</u>	\$18.50	LS Electric 140W 30Ω encapsulated braking resistor	<u>PDF</u>	All 400W LS drives
<u>APCS-300R30-AD</u>	\$24.00	LS Electric 300W 30Ω encapsulated braking resistor	<u>PDF</u>	All 230VAC 750W and 1kW LS drives
<u>APC-600R30-AD</u>	\$42.00	LS Electric 600W 30Ω encapsulated braking resistor.	<u>PDF</u>	All 230VAC 2.2 kW and 3.5 kW LS drives
APC-600R28-AD	\$64.00	LS Electric 600W 28Ω encapsulated braking resistor.	<u>PDF</u>	All 230VAC 5.5 kW and 7.5 kW LS drives
APCS-300R82-AD	\$16.00	LS Electric 300W 82Ω encapsulated braking resistor.	<u>PDF</u>	All 460VAC 1kW LS drives
APCS-600R140-AD	\$42.00	LS Electric 600W 140 Ω encapsulated braking resistor.	<u>PDF</u>	All 460VAC 2.2 kW and 3.5 kW LS drives
APCS-600R75-AD	\$42.00	LS Electric 600W 75Ω encapsulated braking resistor.	<u>PDF</u>	All 460VAC 5.5 kW and 7.5 kW LS drives



APCS-140R50-AD



NOTE: 600W resistors require customer-supplied M5-.8 bolts and cable lugs for connection.

LSELECTRIC AC Servo Systems Accessories

Servo System EMI Filters

Input EMI filters reduce electromagnetic interference or noise on the input side of the servo drive. They are required for CE compliance and recommended for installations prone to or sensitive to electromagnetic interference.

Part Number	Price	Rating	Description	Drawing	Compatible Drives
<u>TB1-10A0D0</u>	\$67.00	10A	LS Electric EMI input filter, 250 VAC, 1-phase, 10A, panel mount, EMI/RFI filtering, 2-stage, drive rated, standard performance, screw terminals. For use with 1-phase AC drives.	PDF	All L7C series drives
<u>TB6-B010LBEI</u>	\$86.00	10A		<u>PDF</u>	L7P and iX7NH 230V 400W through 1kW drives
<u>TB6-B020NBDC</u>	\$110.00	20A		<u>PDF</u>	L7P 460V 2kW and 3.5 kW drives
TB6-B030NBDC	\$104.00	30A	LS Electric EMI input filter, 550VAC, 3-phase, panel mount, EMI/RFI filtering, drive rated, standard performance, screw terminals	PDF	L7P and iX7NH 230V: 2kW, 3.5 kW and L7P 460V: 5kW
TB6-B040AS	\$180.00	40A	screw terminals.	PDF	L7P 230V: 5kW 460V: 7.5 kW
<u>TB6-B060LAS</u>	\$313.00	50A		<u>PDF</u>	L7P 230V: 7.5 kW drives



TB1-10A0D0



TB6-B010LBEI



LECTRIC LS Electric AC Servo Systems

Accessories, continued

NOTE: These parts available for sale to North American locations only

L7C/L7P/iX7NH System Planetary Gearboxes

Precision planetary gearboxes can increase the torque output of servo systems while reducing the reflected load inertia for higher response. Gearboxes offer high stiffness, high efficiency, and very quiet operation. Input motor shaft clamp, oversized output shaft key, and mounting hardware are included for mating to LS Electric motors.

Features.

- Maintenance free (no need to replace lubrication)
- IP65
- Operating temperature range of -10°C to +90°C [14°F to 194°F]
- Uses VIGO Grease RE #0



MSS Series Planetary Gearbox

MSS Series Planetary Gearbox Specfications											
Model	<u>96200004</u>	<u>96200005</u>	<u>96200103</u>	96200007	96200008	96200257	96200373	<u>96200378</u>	96200393	<u>96200459</u>	
Manufacturer Part Number	MSS0601A- 005KS- B3110103C14	MSS0601A- 010KS- B3110103C14	MSS0902B- 020KS- B3110103C14	MSS0901A- 005KS- C3110103C19	MSS0901A- 010KS- C3110103C19	MSS1152B- 020KS- C3110103C19	MSS0901A- 005KS- C4120103C19	MSS0901A- 010KS- C4120103C19	MSS1152B- 020KS- C4120103C19	MSS1151A- 005KS- D3110103C22	
Compatible Motors	APMC-FBL series 100, 200, and 400 W motors			APMC FCL s	series 750W and	1kW motors	APM-FE seri	APM-FE series 1.6 kW motors			
Price	\$288.00	\$296.00	\$528.00	\$387.00	\$387.00	\$762.00	\$350.00	\$350.00	\$699.00	\$499.00	
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	
Ratio	5:1	10:1	20:1	5:1	10:1	20:1	5:1	10:1	20:1	5:1	
Nominal Output Torque	54 N·m	42 N·m	143 N·m	160 N·m	121 N·m	295 N·m	160 N·m	121 N·m	295 N·m	332 N·m	
Inertia	0.13 kg/cm ²	0.13 kg/cm ²	0.13 kg/cm ²	0.48 kg/cm ²	0.44 kg/cm ²	0.48 kg/cm ²	0.48 kg/cm ²	0.44 kg/cm ²	0.48 kg/cm ²	2.81 kg/cm ²	
Output Shaft Diameter	16mm	16mm	22mm	22mm	22mm	32mm	22mm	22mm	32mm	32mm	
Stage	1	1	2	1	1	2	1	1	2	1	
Frame	60mm	60mm	90mm	90mm	90mm	115mm	90mm	90mm	115mm	115mm	
Nominal Input Speed (rpm)	5,000	5,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
Max Input Speed (rpm)	10,000	10,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	
Emergency Stop Torque	3 times nominal output torque										
Noise (dB)	≤54	≤54	≤56	≤56	≤56	≤59	≤56	≤56	≤59	≤59	
Efficiency (%)	≥97	≥97	≥94	≥97	≥97	≥94	≥97	≥97	≥94	≥97	
Backlash (Arcmin)	≤7	≤7	≤9	≤7	≤7	≤9	≤7	≤7	≤9	≤7	
Max Radial Load (N)	1,280	1,280	3,200	3,200	3,200	6,800	3,200	3,200	6,800	6,800	
Max Axial Load (N)	690	690	1,600	1,600	1,600	3,400	1,600	1,600	3,400	3,400	
Service Life (Hours)	20,000 (10,000 under continuous operation)										
Continued on next page											

LS ELECTRIC LS Electric AC Servo Systems

Accessories, continued

MSS Series Planetary Gearbox Specfications											
Model	96200464	96200479	96200010	96200011	96200445	96200013	96200014	96200701	96200016	96200017	96200862
Manufacturer Part Number	MSS1151A- 010KS- D3110103C22	MSS1422B- 020KS- D3110103C22	MSS1151A- 005KS- D3110103C24	MSS1151A- 010KS- D3110103C24	MSS1422B- 020KS- D3110103C24	MSS1421A- 005KS- E3110103C35	MSS1421A- 010KS- E3110103C35	MSS1802B- 020KS- E3110103C35	MSS1801A- 005KS- F3110103C42	MSS1801A- 010KS- F3110103C42	MSS1802A- 015KS- F3110103C42
Compatible Motors	APM-FE series 1.6 kW motors		APM-FE series 2.2 kW motors			APM-FF series 3.5 kW and 5.5 kW motors			APM-FF series 7.5 kW motors		
Price	\$499.00	\$1,030.00	\$499.00	\$499.00	\$1,030.00	\$770.00	\$770.00	\$1,850.00	\$1,480.00	\$1,480.00	\$1,850.00
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF
Ratio	10:1	20:1	5:1	10:1	20:1	5:1	10:1	20:1	5:1	10:1	15:1
Nominal Output Torque	262 N·m	295 N·m	332 N·m	262 N·m	295 N·m	634 N·m	500 N·m	1060 N·m	1195 N·m	960 N·m	897 N·m
Inertia	2.59 kg/cm ²	2.81 kg/cm ²	2.81 kg/cm ²	2.59 kg/cm ²	2.81 kg/cm ²	7.52 kg/cm ²	7.05 kg/cm ²	7.52 kg/cm ²	24.29 kg/cm ²	23.51 kg/cm ²	24.29 kg/cm ²
Output Shaft Diameter	32mm	40mm	32mm	32mm	40mm	40mm	40mm	55mm	55mm	55mm	55mm
Stage	1	2	1	1	2	1	1	2	1	1	2
Frame	115mm	142mm	115mm	115mm	142mm	142mm	142mm	180mm	180mm	180mm	180mm
Nominal Input Speed (rpm)	4,000	3,000	4,000	4,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Max Input Speed (rpm)	8,000	6,000	8,000	8,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Emergency Stop Torque	3 times nominal output torque										
Noise (dB)	≤59	≤62	≤59	≤59	≤62	≤62	≤62	≤64	≤64	≤64	≤64
Efficiency (%)	≥97	≥94	≥97	≥97	≥94	≥97	≥97	≥94	≥97	≥97	≥94
Backlash (Arcmin)	≤7	≤9	≤7	≤7	≤9	≤7	≤7	≤9	≤7	≤7	≤9
Max Radial Load (N)	6,800	9,300	6,800	6,800	9,300	9,300	9,300	15,100	15,100	15,100	15,100
Max Axial Load (N)	3,400	4,500	3,400	3,400	4,500	4,500	4,500	7,500	7,500	7,500	7,500
Service Life (Hours)					20,000 (10,00	0 under continu	ous operation)				

www.automationdirect.com **Motion Control**



AC Servo Systems

Drive features

- Power:
- 1 phase 110VAC: 100W-2kW
- 1 phase 220VAC: 100W-2kW
- 3 phase 220VAC: 100W-15kW
- 3 phase 460VAC: 400W-15kW
- Fully digital with up to 3.1 kHz bandwidth velocity loop response
- Easy setup and diagnostics with built-in keypad/display or the SureServo2 Pro PCbased software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- · Communications include:
- Serial Modbus (native/built-in)
- Optional Modbus TCP card
- Optional Ethernet/IP card (this card can use implicit and explicit messaging. SureServo2 Pro software can generate an EDS file to transfer custom data between PLC and drive)
- · Command options include:
- ± 10V torque or velocity command
- Pulse train or master encoder position command (accepts line driver or open collector) with electronic gearing
- Powerful built-in motion controller for position control using 99 preset positions (enter these during development, or send them through the communications options above during runtime)
- Internal sequencing for position/speed

commands, registration (capture/compare), electronic camming, homing (10 different options), Jumps, and arithmetic statements.

- The 3.1 kHz bandwidth allows for high-level automatic tuning. Several modes of tuning are available including Auto Tune that can estimate the load inertia and fine-tune the system when all the loads are attached.
- Optically isolated digital inputs (10) and outputs (6), analog outputs for monitor signals (2), and line driver output for encoder (with scalable resolution).
- Other Features:
- Secondary/Auxiliary encoder feedback (for true closed loop control)
- Registration ability
- Analog positioning
- Safe Torque Off (STO) included so no need for large, bulky contactors to disconnect power from the drive in E-stop situations
- Absolute Encoder operation (with optional encoder battery backup)
- Electronic camming (you can define the cam with SureServo2 Pro software or you can import an Excel spreadsheet)
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.

Motor features

- · Low inertia models:
 - 100W, 200W, 400W, 750W, 1kW, 1.5 kW, and 2kW
- Speeds up to 6,000 rpm
- · Medium inertia models:
- 1kW, 1.5 kW, 2kW, and 3kW
- Speeds up to 3,000 rpm
- · High inertia models:
 - 3kW, 4.5 kW, 5.5 kW, 7.5 kW, 11kW, and 15kW
- Speeds up to 3,000 rpm
- Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style couplings
- Integrated encoder with 16,777,216 encoder pulses/revolution plus marker pulse (once per revolution)
- Optional 24 VDC spring-set holding brakes (xxxxB series motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for brake motors 230V systems 5.5kW and larger or 460V systems 11kW and larger)
- Motor cables available in standard or flexrated lengths of 3, 5, 10, and 20m
- Standard 50-pin DIN-rail mounted break-out kit for the drive's CN1 connector (with screw terminal connections), or 20-pin spring clamp terminal block (limited I/O) that mounts directly to the drive

SureServo2 tuning technology

The SureServo2 drive closes the loop on current, velocity, and position (depending on control mode selection). The 3.1 kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and five (5) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can easily tune systems with as much as 60:1 inertia mismatch.

There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor.

The drive has several tuning methods available:

- One Touch Auto Tuning—the drive tunes the motor without any motion (static motor/ system analysis)
- Normal Auto Tuning—the drive tunes the load while an external controller or the drive's internal indexer provides point-to-point moves
- Assisted Tuning–3 modes where the drive tunes the motor while moving. The user can adjust responsiveness while the drive is analyzing the system
- Manual Tuning–20+ parameters are available to give power users the ultimate flexibility to tune their systems.

SureServo2 Built-in motion controller

While the SureServo2 drives can accept traditional commands from host controls, they can also provide their own internal motion control. For example, up to 99 index moves can be pre-defined and stored in the drive and then selected and executed using digital inputs (inputs as events or inputs used as a multiplexer) or communication (serial Modbus, Modbus TCP, or Ethernet/IP). The index profiles can also be changed while in-process with digital events or via comms. The internal motion can consist of incremental or absolute moves, and can be sequenced internally with delays in between the moves or moves can be linked together so they are processed one after the other.

Multi-axis systems can be controlled via digital inputs, or serial/Ethernet communication. The motion can be commanded from a powerful external controller that sends out high speed pulses to each drive, or the motion can be initiated by a low-level controller (the simplest CLICK PLC) since each drive has a powerful motion controller inside. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

SureServo2 Optional Holding Brake

Each SureServo2 motor rating can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

SureGear® Precision Gearboxes for Servo motors

Inertia balancing issue in your design?

The SureGear PGA series easily mates to SureServo2 motors. Everything you need to mount your SureServo2 motor is included!

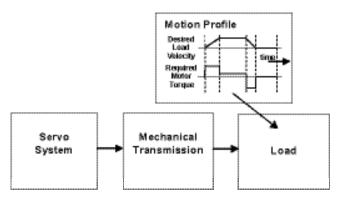
- Four gear ratios available (5, 10, 15, 25:1)
- Mounting hardware included for attaching to SureServo2 motors
- Industry-standard mounting dimensions
- Thread-in mounting style
- Best-in-class backlash (5 arc-min)
- 5-year warranty

AC Servo Systems

How to select and apply SureServo2 systems

The primary purpose of the AC servo system is to precisely control the motion of the load. The most fundamental considerations in selecting the servo system are "reflected" load inertia, servo system maximum speed requirement, servo system continuous torque requirement, and servo system peak torque requirement. In a retrofit application, select the largest torque SureServo2 system that most closely matches these parameters for the system being replaced. In a new application, these parameters should be determined through calculation and/or measurement. SureServo2 Pro has the ability to measure the load (reflected) inertia and accurately measure the motor torque output.

AutomationDirect has teamed with Copperhill Technologies to provide free servo-sizing software. "VisualSizer-SureServo" software will assist in determining the correct motor and drive for your application by calculating the reflected load inertia and required speed and torque based on the load configuration. "VisualSizer-SureServo" software can be downloaded from www. automationdirect.com on the store page for your drive.



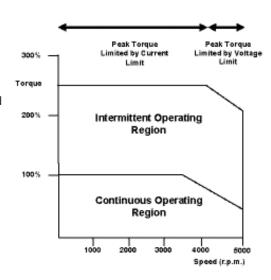
1. "Reflected" load inertia

The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the motor driveshaft. The ratio of "reflected" load inertia to motor inertia needs to be carefully considered when selecting the servo system.

In general, applications that need high response or bandwidth will benefit from keeping the ratio of load inertia to motor inertia as low as possible and ideally under 10:1. Systems with ratios as high as 200:1 can be implemented, but corresponding lower bandwidth or responsiveness must be accepted. The servo response including the attached load inertia is determined by the servo tuning. SureServo2 systems may be tuned manually, fully Automatically, or via a hybrid mode where the software tunes the system with input for system responsiveness from the user.

2. Torque and speed

With knowledge of the motion profile and any mechanical transmission between the motor and load, calculations can be made to determine the required servo motor continuous torque, peak torque, and maximum motor speed. The required amount of continuous torque must fall inside the continuous operating region of the system torque-speed curve (you can check the continuous torque at the average speed of the motion profile). The required amount of peak torque must also fall within the servo system's intermittent operating region of the system torque-speed curve (you need to check this value at the required maximum speed or torque). If you have a SureServo2 system, these values are easily captured and recorded with the Scope feature built into SureServo2 Pro. If you are designing the system, use VisualSizer to define the system and calculate expected inertia and required power.



AC Servo Systems

Application tip - coupling considerations

The SureServo2 motors have keyed shafts that can be used with keyed couplings or with clamp-on or compression style couplings. "Servo-grade" clamp-on or compression style couplings are usually the best choice when you consider the stiffness, torque rating, and inertia. Higher stiffness

(lb-in/radian) is needed for better response but there is a tradeoff between the stiffness and the added inertia of the coupling. Concerning the torque rating of the coupling, use a safety factor of 1.25 over the SureServo2 **peak** torque requirement of your application.

Available Couplings

Mechanical transmissions

Common mechanical transmissions include leadscrews, rack & pinion mechanisms, conveyors, gears, and timing belts. The use of leadscrew, rack & pinion, or conveyor are common ways to translate the rotary motion of the servo motor into linear motion of the load. The use of a speed reducer such as a gearbox or timing belt can be very beneficial as follows:

1. Reduction of reflected load inertia

As a general rule, it is beneficial to keep the reflected load inertia as low as possible while using the full range of servo speed. SureServo2 systems can go up to 6,000 rpm for the low inertia motors and up to 3,000 rpm for the medium inertia motors.

Example: A gearbox reduces the required torque by a factor of the gear ratio, and reduces the reflected load inertia by a factor of the gear ratio squared. A 10:1 gearbox reduces output speed to 1/10, increases output torque 10 times, and decreases reflected inertia to 1/100.

However, when investigating the effect of different speed reduction ratios DO NOT forget to include the added inertia of couplings, gearbox, or timing belt pulleys. These added inertias can be significant, and can negate any inertia reduction due to the speed reduction.

2. Low speed and high torque applications

If the application requires low speed and high torque then it is common to introduce a speed reducer so that the servo

system can operate over more of the available speed range. This could also have the added benefit of reducing the servo motor torque requirement which could allow you to use a smaller and lower cost servo system. Additional benefits are also possible with reduction in reflected inertia, increased number of motor encoder counts at the load, and increased ability to reject load disturbances due to mechanical advantage of the speed reducer.

3. Space limitations and motor orientation

SureServo2 motors can be mounted in any orientation, but the shaft seal should not be immersed in oil (open-frame gearbox, etc.). Reducers can possibly allow the use of a smaller motor or allow the motor to be repositioned. For example, some reducers would allow for in-line, right angle, or parallel mounting of the motor.

For more information, refer to the website listed below.

Mechanical Transmission: <u>Timing Belts and Pulleys</u>
Precision Gearboxes

Ordering guide instructions

The following four pages are your ordering guide for SureServo2 systems. Each system has a torque-speed curve included for reference. This is the fundamental information that you need to select the servo motor and matching drive for your application.

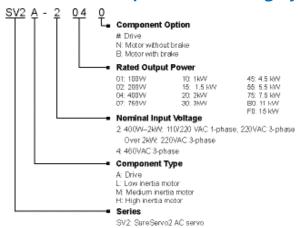
Each system needs:

- Motor
- Drive
- Motor Power Cable
- Motor Encoder Cable
- I/O connections (either CN1 cable + RTB breakout board, or an LTB20 breakout board that mounts on the drive)
- For brakemotors 4.5 kW and below, the brake wiring is included in the power cable. For brakemotors 5.5 kw and above, a separate brake cable is required.

A wide variety of optional accessories are also available, such as Ethernet cards, RS485 splitters/terminators, toroids, etc.

You can also use the SureServo2 selector tool on the AutomationDirect.com website to help you configure your system.

SureServo2 series drives and motors part numbering system



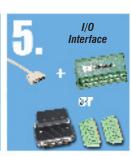
Here is what you will need to order a complete servo system:













NOTE: Unit can be programmed via keypad. Optional programming software (free download) and optional programming cable available.



NOTE: If you need a gear box for your configuration, you can do it easily online: http://www.sureservo.com/gearbox/selector



tMNC-275



AC Servo System Configuration

Torque to SureServo2 System Quick Reference

	230V System Torque								
System Rated Torque (N·m)	System Maximum Torque (N·m)	Suggested Servo Motor	Required Servo Drive						
0.32	1.12	SV2L-201N or SV2L-201B	<u>SV2A-2040</u>						
0.64	2.24	SV2L-202N or SV2L-202B	<u>SV2A-2040</u>						
1.27	3.96	SV2L-204N or SV2L-204B	<u>SV2A-2040</u>						
2.39	7.86	SV2L-207N or SV2L-207B	SV2A-2075						
3.18	8.12	SV2L-210N or SV2L-210B	SV2A-2150						
4.77	14.32	<u>SV2M-210N</u> or <u>SV2M-210B</u>	SV2A-2150						
7.16	14.88	SV2M-215N or SV2M-215B	SV2A-2150						
9.55	24.54	SV2M-220N or SV2M-220B	SV2A-2200						
17.55	48.29	SV2M-230N or SV2M-230B	SV2A-2300						
28.65	71.62	SV2H-245N or SV2H-245B	SV2A-2550						
35.01	87.53	SV2H-255N or SV2H-255B	SV2A-2550						
47.74	119.36	SV2H-275N or SV2H-275B	SV2A-2750						
70	175	SV2H-2B0N or SV2H-2B0B	SV2A-2F00						
95.4	224.0	SV2H-2F0N or SV2H-2F0B	<u>SV2A-2F00</u>						

	460V System Torque								
System Rated Torque (N·m)	System Maximum Torque (N·m)	Suggested Servo Motor	Required Servo Drive						
1.27	4.45	SV2L-404N or SV2L-404B	<u>SV2A-4040</u>						
2.24	7.58	SV2L-407N or SV2L-407B	<u>SV2A-4075</u>						
3.18	9.54	SV2L-410N or SV2L-410B	<u>SV2A-4150</u>						
4.77	14.32	<u>SV2M-410N</u> or <u>SV2M-410B</u>	<u>SV2A-4150</u>						
7.16	18.1	SV2L-415N or SV2L-415B	<u>SV2A-4150</u>						
9.55	28.65	SV2L-420N or SV2L-420B	<u>SV2A-4200</u>						
19.1	49.38	SV2H-430N or SV2H-430B	SV2A-4300						
28.65	64.61	<u>SV2H-445N</u> or <u>SV2H-445B</u>	<u>SV2A-4550</u>						
35.01	73.48	SV2H-455N or SV2H-455B	SV2A-4550						
47.74	93.71	SV2H-475N or SV2H-475B	<u>SV2A-4750</u>						
70	175	SV2H-4B0N or SV2H-4B0B	<u>SV2A-4F00</u>						
95.4	224.0	SV2H-4F0N or SV2H-4F0B	<u>SV2A-4F00</u>						

www.automationdirect.com Motion Control



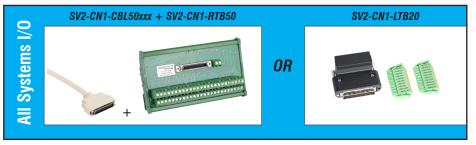
SureServo2 AC servo drive, motor, and cable combinations

C-E122-xxNN
C-E122-xxFN
C-E122-xxNN
C-E122-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable. The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



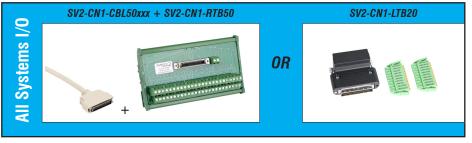
SureServo2 AC servo drive, motor, and cable combinations, continued

	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		prosi	<u>SV2L-204N</u>		SV2C-PA18-xxNN	SV2C-E122-xxNN
	120V	j. Intermittent Region		SV2A-2040	SV2C-PA18-xxFN	SV2C-E122-xxFN
		(127) (128%) Continuous Region	SV2L-204B		SV2C-PB18-xxNB	SV2C-E122-xxNN
		Quant Quanty			SV2C-PB18-xxFB	SV2C-E122-xxFN
400W Low Inertia System		2-00 1-10-04 2-00 1-10-04	SV2L-204N		SV2C-PA18-xxNN	SV2C-E122-xxNN
Inertia	230V			SV2A-2040	SV2C-PA18-xxFN	SV2C-E122-xxFN
W Low	200 V	230V	SV2L-204B	<u>012772040</u>	SV2C-PB18-xxNB	SV2C-E122-xxNN
400		3(00) 4,400 H,400 Epoch (r/min)	<u>072L-204D</u>		SV2C-PB18-xxFB	SV2C-E122-xxFN
		440	SV2L-404N	0)/04 4040	SV2C-PA18-xxNN	SV2C-E122-xxNN
	460V	2.00 (2.00) Intermittent Region			SV2C-PA18-xxFN	SV2C-E122-xxFN
	4000	460V	CV01 404P	SV2A-4040	SV2C-PB18-xxNB	SV2C-E122-xxNN
Note			SV2L-404B		SV2C-PB18-xxFB	SV2C-E122-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable. The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

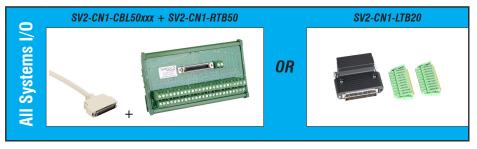
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		724	<u>SV2L-207N</u>		SV2C-PA18-xxNN	SV2C-E122-xxNN
	120V	lateralited Region		SV2A-2075	SV2C-PA18-xxFN	SV2C-E122-xxFN
	1200	(1994) Combination Region	SV2L-207B	<u> </u>	SV2C-PB18-xxNB	SV2C-E122-xxNN
		t, Sam 2, Sam 5, Sam Epined (c) min()	3,12,23,12		SV2C-PB18-xxFB	SV2C-E122-xxFN
750W Low Inertia System		(Cana)	SV2L-207N		SV2C-PA18-xxNN	SV2C-E122-xxNN
Inertia		(277) Priceri Scat Region	OVEL ESTIT	SV2A-2075	SV2C-PA18-xxFN	SV2C-E122-xxFN
W Low	2007	2.50 (mm) Continuous Region	SV2L-207B	<u> </u>	SV2C-PB18-xxNB	SV2C-E122-xxNN
750		Shoot (American)			SV2C-PB18-xxFB	SV2C-E122-xxFN
		23	SV2L-407N		SV2C-PA18-xxNN	SV2C-E122-xxNN
	460V	(ami)	3V2L-40/1N	0.104 4075	SV2C-PA18-xxFN	SV2C-E122-xxFN
	(man) 198 (Sin) Continuous Region	120	CV21 407D	SV2A-4075	SV2C-PB18-xxNB	SV2C-E122-xxNN
		2 mm 4204 040m	SV2L-407B		SV2C-PB18-xxFB	SV2C-E122-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

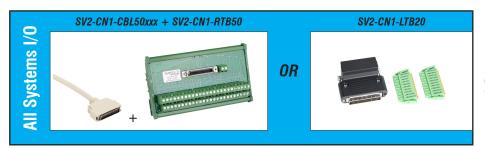
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		B.D.	SV2L-210N		SV2C-PC16-xxNN	SV2C-E222-xxNN
	120V			SV2A-2150	SV2C-PC16-xxFN	SV2C-E222-xxFN
	1200	Continuous Region	SV2L-210B	<u> </u>	SV2C-PC16-xxNB	SV2C-E222-xxNN
1		1,000 2,000 3,000 2,000 2,000	5.22.2.52		SV2C-PC16-xxFB	SV2C-E222-xxFN
Systen		ALI COMPA	SV2L-210N		SV2C-PC16-xxNN	SV2C-E222-xxNN
1.0 kW Low Inertia System	The state of the s	betomittent Region	\	SV2A-2150	SV2C-PC16-xxFN	SV2C-E222-xxFN
W Low	230 V	230V 5334 Continuous Region	SV2L-210B	<u>57272150</u>	SV2C-PC16-xxNB	SV2C-E222-xxNN
1.0 1		131 3,000 3,300 5,000 2,000 4,0000			SV2C-PC16-xxFB	SV2C-E222-xxFN
		C 434	CVOL 440N		SV2C-PC16-xxNN	SV2C-E222-xxNN
	4607	460V	SV2L-410N	SV2A-4150	SV2C-PC16-xxFN	SV2C-E222-xxFN
	40UV		C)/QL 440D		SV2C-PC16-xxNB	SV2C-E222-xxNN
			SV2L-410B		SV2C-PC16-xxFB	SV2C-E222-xxFN
Not	u ffront!! in the ealth	nart numbers represents cable length: SV2C-v	vvv 10vv io o 10m oobl	•		

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		M-S2 passag	<u>SV2M-210N</u>		SV2C-PC12-xxNN	SV2C-E222-xxNN
	120V			SV2A-2150	SV2C-PC12-xxFN	SV2C-E222-xxFN
	1200	F Intermittent Region 4.77 (1204) Continuous Region	SV2M-210B	<u>372A-2130</u>	SV2C-PC12-xxNB	SV2C-E222-xxNN
ш		Time 1,500 2,000 Special physics	<u> </u>		SV2C-PC12-xxFB	SV2C-E222-xxFN
ia Syste		14/25	SV2M-210N		SV2C-PC12-xxNN	SV2C-E222-xxNN
1.0 kW Medium Inertia System	230V	Intermittent Region	<u> 3vzivi-z totv</u>	SV2A-2150	SV2C-PC12-xxFN	SV2C-E222-xxFN
Mediu	2500	Continuos Rejon	SV2M-210B	<u>592772 150</u>	SV2C-PC12-xxNB	SV2C-E222-xxNN
1.0 KW					SV2C-PC12-xxFB	SV2C-E222-xxFN
		H725	CV/2M 440N		SV2C-PC16-xxNN	SV2C-E222-xxNN
	4001/	intermittent Region	SV2M-410N		SV2C-PC16-xxFN	SV2C-E222-xxFN
		CV/QM 440D	SV2A-4150	SV2C-PC16-xxNB	SV2C-E222-xxNN	
			SV2M-410B		SV2C-PC16-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: $\,$ SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable
SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable

SV2-CN1-CBL50xxx + SV2-CN1-RTB50

SV2-CN1-LTB20

OR



SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

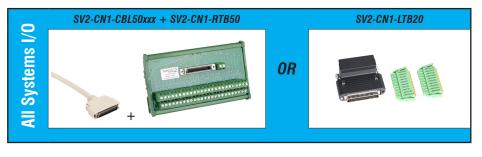
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*	
		THAM SERVICE STATE OF THE SERV	SV2M-215N		SV2C-PC12-xxNN	SV2C-E222-xxNN	
m:	120V	Principles Indicate Indicate		SV2A-2150	SV2C-PC12-xxFN	SV2C-E222-xxFN	
a Syste	1200	Continuous Region	SV2M-215B	<u>372A-2130</u>	SV2C-PC12-xxNB	SV2C-E222-xxNN	
1.5 kW Medium Inertia System		Speech promise	<u>3v2IVI-213D</u>		SV2C-PC12-xxFB	SV2C-E222-xxFN	
Mediur		H	SV2M-215N		SV2C-PC12-xxNN	SV2C-E222-xxNN	
1.5 kW	Intermittent Region	Ĭ /	3V2IVI-213IV		SV2C-PC12-xxFN	SV2C-E222-xxFN	
	230V	230V P P P P P P P P P P P P P P P P P P P			SV2A-2150	SV2C-PC12-xxNB	SV2C-E222-xxNN
		Fined Mariel	<u>SV2M-215B</u>		SV2C-PC12-xxFB	SV2C-E222-xxFN	
ystem		(2030)	SV2L-415N		SV2C-PC16-xxNN	SV2C-E222-xxNN	
nertia S	4007	International Region	3V2L-415IN	- SV2A-4150	SV2C-PC16-xxFN	SV2C-E222-xxFN	
1.5 kW Low Inertia System	40UV	460V	01/01 4450		SV2C-PC16-xxNB	SV2C-E222-xxNN	
1.5 kW			SV2L-415B		SV2C-PC16-xxFB	SV2C-E222-xxFN	

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable. The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable

SV2C-xxxx-xxNB is a non-flex, brake motor cable





SureServo2 System Selector **Online**



SureServo2 AC servo drive, motor, and cable combinations, continued

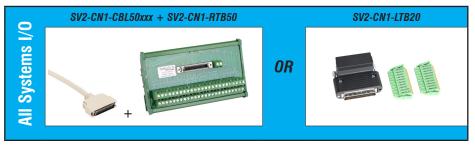
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		34.54 (2073)	SV2M-220N		SV2C-PD12-xxNN	SV2C-E222-xxNN
m.	120V	Intermittent Region	<u> </u>	SV2A-2200	SV2C-PD12-xxFN	SV2C-E222-xxFN
2.0 kW Medium Inertia System	1200	Continues Region	SV2M-220 <u>B</u>	<u>3V2A-2200</u>	SV2C-PD12-xxNB	SV2C-E222-xxNN
n Inerti		2 1,500 1,50	<u>3vzivi-zzud</u>		SV2C-PD12-xxFB	SV2C-E222-xxFN
Mediur		2634	SV2M-220N		SV2C-PD12-xxNN	SV2C-E222-xxNN
2.0 kW	i	i increitori Region	<u> 3vzivi-zzuiv</u>		SV2C-PD12-xxFN	SV2C-E222-xxFN
	230V	230V F , 123	SV2M-220B	SV2A-2200	SV2C-PD12-xxNB	SV2C-E222-xxNN
		gered + Amin 2,000 2,000 2,000			SV2C-PD12-xxFB	SV2C-E222-xxFN
ystem		.=	SV2L-420N	0)/04 /000	SV2C-PC16-xxNN	SV2C-E222-xxNN
nertia S	460)/	460V	5V2L-420IV		SV2C-PC16-xxFN	SV2C-E222-xxFN
2.0 kW Low Inertia System	4000		C//01 400D	SV2A-4200	SV2C-PC16-xxNB	SV2C-E222-xxNN
2.0 KM			SV2L-420B		SV2C-PC16-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable. The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable

SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

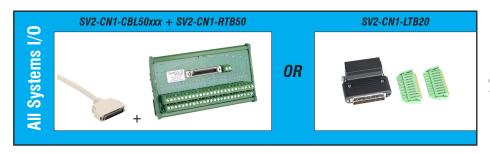
n	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
a Systen		(6.23) (1073)	<u>SV2M-230N</u>		SV2C-PD12-xxNN	SV2C-E222-xxNN
m Inertia	230V	i landinthia	<u> </u>	CV2A 2200	SV2C-PD12-xxFN	SV2C-E222-xxFN
3.0 kW Medium Inertia System	2300	USS (1984) (274) (CV2M 220D	<u>SV2A-2300</u>	SV2C-PD12-xxNB	SV2C-E222-xxNN
3.0 KI		tymin pro yma Egnod bywin)	<u>SV2M-230B</u>		SV2C-PD12-xxFB	SV2C-E222-xxFN
ystem		<u>II</u>	SV2H-430N	0.01.000	SV2C-PD12-xxNN	SV2C-E222-xxNN
3.0 kW High Inertia System	460V	harries Rajon			SV2C-PD12-xxFN	SV2C-E222-xxFN
N High I	450V p part part 1,200 3,000	C/\2H 430B	SV2A-4300	SV2C-PD12-xxNB	SV2C-E222-xxNN	
3.0 KM			SV2H-430B		SV2C-PD12-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		71.00 (2000)			SV2C-PD08-xxNN	SV2C-E222-xxNN
	2201/	leterritori Region	<u>SV2H-245N</u>	SV2A-2550	SV2C-PD08-xxFN	SV2C-E222-xxFN
System	2500	230V	S//2H 245D	3V2A-2330	SV2C-PD08-xxNB	SV2C-E222-xxNN
Inertia			<u>SV2H-245B</u>		SV2C-PD08-xxFB	SV2C-E222-xxFN
4.5 kW High Inertia System		passed passed	SV2H-445N	- SV2A-4550	SV2C-PD08-xxNN	SV2C-E222-xxNN
4.5	460V Promites Region 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50				SV2C-PD08-xxFN	SV2C-E222-xxFN
		CV2H 44ED	3V2A-4330	SV2C-PD08-xxNB	SV2C-E222-xxNN	
			SV2H-445B		SV2C-PD08-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable

SV2C-xxxx-xxNB is a non-flex, brake motor cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector
Online



SureServo2 AC servo drive, motor, and cable combinations, continued

	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		(2) (2) (2) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3	SV2H-255N		SV2C-PF06-xxNN	SV2C-E222-xxNN
	2201/	I beterreitere Begien	<u>SV2H-233N</u>	CV/2A 2550	SV2C-PF06-xxFN	SV2C-E222-xxFN
System	230V 230V 230V 230V 230V 230V 230V 230V		CVOLL OFFI	<u>SV2A-2550</u>	SV2C-PF06-xxNN and SV2C-B120-xxxx	SV2C-E222-xxNN
Inertia			<u>SV2H-255B</u>		SV2C-PF06-xxFN and SV2C-B120-xxxx	SV2C-E222-xxFN
5.5 kW High Inertia System		73.46	SV2H-455N SV2H-455B		SV2C-PD08-xxNN	SV2C-E222-xxNN
5.5	460V	Intermittent Region			SV2C-PD08-xxFN	SV2C-E222-xxFN
	700V	1 100		SV2A-4550	SV2C-PD08-xxNN	SV2C-E222-xxNN
		1,500 i,000 3,000 Special (symbol			SV2C-PD08-xxFN	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable

SV2C-xxxx-xxNB is a non-flex, brake motor cable SV2C-xxxx-xxFB is a flex-rated, brake motor cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

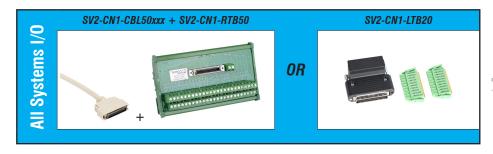
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		(1112)	SV2H-275N		SV2C-PF06-xxNN	SV2C-E222-xxNN
	230V	Fatorei Boat Region	<u> 3VZIT-2/3IN</u>	<u>SV2A-2750</u>	SV2C-PF06-xxFN	SV2C-E222-xxFN
System	2300	pen pen pen pen pen Continuo legim	0.0011.03750		SV2C-PF06-xxNN and SV2C-B120-xxxx	SV2C-E222-xxNN
Inertia		1,500 Symbol Special (c)-sing	<u>SV2H-275B</u>		SV2C-PF06-xxFN and SV2C-B120-xxxx	SV2C-E222-xxFN
7.5 kW High Inertia System		10.37 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000 10.000	SV2H-475N		SV2C-PD08-xxNN	SV2C-E222-xxNN
7.5	460V	lateration Region	3V2Π-4/3IN	SV2A-4750	SV2C-PD08-xxFN	SV2C-E222-xxFN
	400V	Continues Region	SV2H-475B	SV2A-4/30	SV2C-PD08-xxNN	SV2C-E222-xxNN
		1,500 2,000 3,000 Remod Baratas	3 4 21 1-47 3 0		SV2C-PD08-xxFN	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable





SureServo2 System Selector
Online



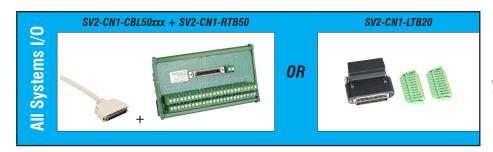
SureServo2 AC servo drive, motor, and cable combinations, continued

	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		1724 (250)	<u>SV2H-2B0N</u>		SV2C-PF06-xxNN	SV2C-E222-xxNN
	230V	i Internition Region	SVZH-ZDUN	<u>SV2A-2F00</u>	SV2C-PF06-xxFN	SV2C-E222-xxFN
System	250 V	Cardinana Ingina	SV2H-2B0B		SV2C-PF06-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN
11.0 kW High Inertia System		1,500 2,600 Special (-)Archite)	<u>SV2R-2BUB</u>		SV2C-PF06-xxFN and SV2C-B120-xxFB	SV2C-E222-xxFN
kW High		173.6	SV2H-4B0N		SV2C-PF08-xxNN	SV2C-E222-xxNN
11.0	460V	lander Region	SVZIT-4DUIN	SV2A-4F00	SV2C-PF08-xxFN	SV2C-E222-xxFN
	4000	Sub- prosper page page page page page page page page	SV2H-4B0B	3V2A-41 00	SV2C-PF08-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN
		1,500 ARR	3V2П-4DVB		SV2C-PF08-xxFN and SV2C-B120-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: $\,$ SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable SV2C-xxxx-xxFN is a flex-rated, non-brake cable





SureServo2 System Selector Online



SureServo2 AC servo drive, motor, and cable combinations, continued

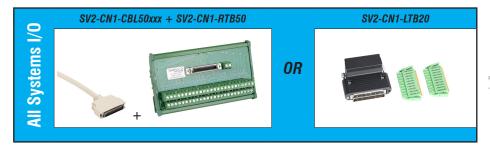
	Input Voltage	Torque Chart	SureServo2 Motor	SureServo2 Drive	Power Cable*	Encoder Cable*
		2044 (2014)	<u>SV2H-2F0N</u>		SV2C-PF04-xxNN	SV2C-E222-xxNN
	230V	laterat Region	SVZH-ZFUN	SV2A-2F00	SV2C-PF04-xxFN	SV2C-E222-xxFN
System	200V	7.00 7.00 7.00 7.00 7.00 7.00 7.00 7.00	SV2H-2F0B	<u> </u>	SV2C-PF04-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN
15.0 kW High Inertia System		1,500 2,600 Speed \$-\$-sir\$	SVZH-ZFUB		SV2C-PF04-xxFB and SV2C-B120-xxFB	SV2C-E222-xxFN
kW High		234.8	SV2H-4F0N		SV2C-PF08-xxNN	SV2C-E222-xxNN
15.0	460V	Indeposit Region	SVZIT-4FUIN	SV2A-4F00	SV2C-PF08-xxFN	SV2C-E222-xxFN
	4000	7.14 (2004) (2004) Continuous Region	SV2H-4F0B	3V2A-4F00	SV2C-PF08-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN
		1,500 2,000 Opened 4-jenisty	SVZIT-4FVD		SV2C-PF08-xxFN and SV2C-B120-xxFB	SV2C-E222-xxFN

Note: "xx" in the cable part numbers represents cable length: SV2C-xxxx-10xx is a 10m cable.

The final two digits indicate flex rating and motor brake compatibility:

SV2C-xxxx-xxNN is a non-flex, non-brake motor cable SV2C-xxxx-xxNB is a non-flex, brake motor cable

SV2C-xxxx-xxFN is a flex-rated, non-brake cable





SureServo2 System Selector Online

AC Servo System Software



SureServo2 Pro configuration software

SureServo2 Pro is an optional free downloadable configuration software package for the SureServo2 drives. With SureServo2 Pro installed, a PC may be directly connected to the servo drive via a USB programming cable (part# SV2-PGM-USB15 or SV2-PGM-USB30).

Features

- Easy-to-use Parameter Wizards to guide you through the most common setup functions.
- Digital IO/Jog Control allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.
- Parameter Editor The complete setup for all the drive parameters
- Tune and check the servo response live using the scope feature.
- Upload and download the drive setup. Save the drive setup as a file for backup or future use.
- Edit the drive setup
- · View all drive faults
- View drive variable trends in real time
- Create a custom EtherNet/IP EDS file for data transfer to a PLC using pull-down menus
- Motion Programming ability the PR Window lets you cofigure the 99 "Paths" that store the motion and sequencing commands in the drive

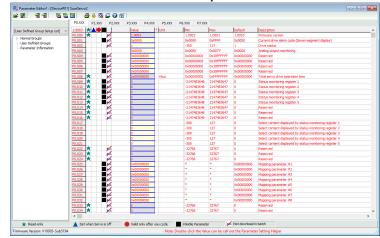
Parameter editor

The SureServo2 Pro configuration tool logically organizes all servo drive parameters for viewing and editing using the Parameter Editor screen. Each parameter has a factory default that usually allows the servo to run "out-of-the-box".

The parameters can be easily changed with available setting ranges displayed. Tuning modes and parameters can also be changed using SureServo2 Pro. After the parameters have been defined, the complete setup can be stored and archived. Drive configurations can be uploaded, edited, saved, and downloaded as often as necessary.

SS2 Pro software even has an "Offline Mode" so you can configure your drive and program your motion without having to be connected to the drive.

Parameter Editor Example Screen



USB Programming Cables

Part Number	Price	Description	Length	Drawing	Compatible Drives
SV2-PGM-USB15	\$32.00	Programming cable,	1.5 m	PDF	All SureServo2
SV2-PGM-USB30	\$34.50	USB A to miniB-USB	3m	<u>PDF</u>	drives

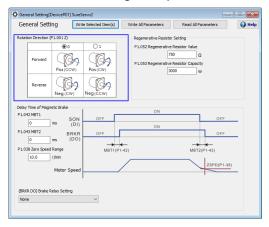


SV2-PGM-USB15

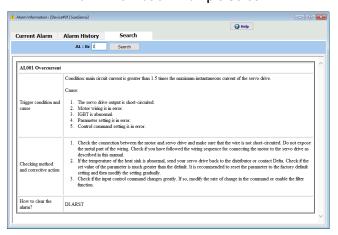
AC Servo System Software

SureServo2 Pro configuration software - (continued)

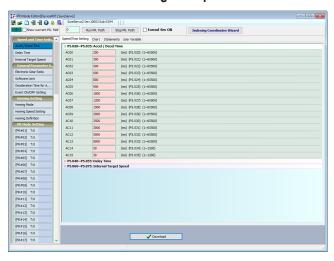
General Setting Example Screen



Alarm Information Example Screen

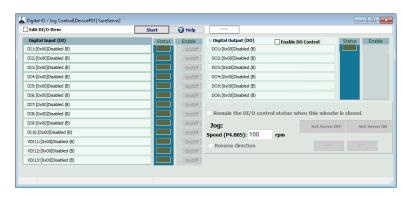


PR Mode Setting Example Screen



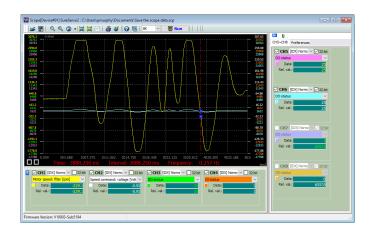
Digital IO/Jog Control screen

The Digital IO/Jog Control screen allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.



Scope

SureServo2 Pro includes a powerful scope function that allows the user to have as many as eight channels of data displayed simultaneously. Each channel has a drop-down table to select the data to be displayed. The scope has the ability to save traces to a file and load those traces for offline review/analysis. This function is a valuable tool for tuning SureServo2 drives.





Servo drive overview

Charge

LED is lit when DC bus is energized (may take several seconds for power to dissipate after incoming power is removed)

Control Power Terminal

220VAC drives: control power = 120 or 220 VAC single phase.

460VAC drives: control power = 24VDC

Main Power Terminal

- 1 phase 110VAC: 100W-2kW
- 1 phase 220VAC: 100W-2kW
- 3 phase 220VAC: 100W-15kW
- 3 phase 460VAC: 400W-15kW

Regenerative Resistor Terminal

- When the internal regenerative resistor is used, the P3 and D terminal are connected together while the P3 and C connection is left open.
- 2. When an external regenerative resistor is used, it is connected across the P3 and C terminals while the P3 and D connection is left open. See the user manual for recommended resistance and power requirements for each system.

Motor Output Terminal

The servo motor power cable is connected to U, V and W. Use our factory made and tested cables available in 3, 5, 10, or 20 meter lengths for easy and trouble free connection.

LED Display

The LED display has 5 full digits and is used to indicate servo status and alarms

Safe Torque Off (STO) Connector Port

erminal ower to 11

Ground Terminals



High Density DB15 Connector

CN5: Auxiliary/Secondary Encoder input. Used for applications requiring Full Closed Loop, Linear Measurement, etc.

Keypad

Five Function keys:

- MODE: Press to change mode
- SHIFT: Press to change parameter group or move cursor left
- UP: Press to increase values
- DOWN: Press to decrease values
- SET: Press to enter value

USB Connector

Used to connect a PC for configuration with SureServo2 Pro software

Serial Communication Interface

RJ45 connectors for RS485 Modbus communication between drives and controllers. Modbus RTU/ ASCII protocol. Use our factorymade cables for easy connection to the PC or the host controller.

I/O Interface

50-pin connector for interfacing the host controller and other types of I/O signals.

- CBL50 + RTB50 = Cable and remote DIN-rail mount module. All I/O pins available.
- LTB20 = Mounted and wired directly at CN1. Most commonly used pins available.
- Command inputs:
 Pulse and Direction
 Encoder Follower
 Analog Velocity/Torque
- (10) Digital Inputs
- (6) Digital Outputs
- (2) Analog Monitors
- Encoder Output (scalable)

A+, A-, B+, B-, Z+, Z-

Encoder Interface

Connector for interfacing the servo motor encoder.

Use our factory-made and tested cables available in 3, 5, 10, or 20 meter lengths for easy and trouble free connection.

SureServo2 systems run "out-of-the-box"... but may be reconfigured for many applications!

The SureServo2 drives are fully digital and include over 400 programmable parameters. For convenience, the parameters are grouped into five categories:

- 1. Monitor parameters
- 2. Basic parameters
- 3. Extended parameters
- 4. Communication parameters5. Diagnostic and analog parameters
- 6. Motion control parameters
- 7. PATH definition parameters

All parameters have commonly used default values which allow you to operate the SureServo2 system "out-of-the-box". However, the programmability and large variety of parameters make the SureServo2 systems suitable for a very broad range of applications, including almost all types of general purpose industrial machinery such as assembly, test, packaging, machine tool, and robotics.

The SureServo2 Pro configuration software has Parameter Wizards to quickly and easily guide you through the most common setup routines.



230V Servo drive specifications

		SureS	ervo2 230	OV Drive S	Specificat	ions				
	Model	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00	
	Price	\$383.00	\$477.00	\$509.00	\$639.00	\$752.00	\$1,043.00	\$1,257.00	\$1,697.00	
	Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	
	Power Rating	400W	750W	1.5 kW	2kW	3kW	5.5 kW	7.5 kW	15kW	
	Input Voltage	Single	e-phase 100–12 e-phase 200–23 e-phase 200–23	0 VAC, -15% to -	+10%	Thre	e-phase 200–23	0 VAC, -15% to -	+10%	
	Input Current 200–230 VAC 3-phase [Amps] rms	2.76	5.09	8.09	11.36	14.52	27.06	37.33	69.95	
	Input Current 100–120 VAC 1-phase [Amps] rms	3.98	7.73	12.56	18.03	_	_	_	-	
Power	Input Current 200–230 VAC 1-phase [Amps] rms	4.69	8.71	14.82	20.83	_	_	-	-	
	Continuous Output Current [Amps] rms	2.60	5.10	8.33	13.40	17.92	41.33	49.04	78	
	Max. Instantaneous Output Current [Amps] rms	8.56	15.43	20.16	40.57	55.93	91.44	127.46	162.04	
	Main Circuit Inrush Current [Amps]	1.44	1.40	1.44	4.64	4.42	9.55	28.68	32.0	
	Control Circuit Inrush Current [Amps]	37.0	37.40	39.80	32.40	36.40	32.80	40.0	37.0	
	Cooling Method	Air Conv. Cooling Fan Cooling								
	Encoder Resolution				24-bit (1677	77216 p/rev)				
	Main Circuit Control				SVPWN	1 control				
	Control Mode					Il / Auto				
	Regenerative Resistor		Built-in (ext	ernal options als				External (optiona	1)	
	Pulse Type			Pulse + Dire	ction, CCW pulse	e + CW pulse, Al	B Quadrature			
Position Control Mode	Max. Input Pulse Frequency				CCW pulse + C\ 3 Quadrature: sir	ction: 4 Mpps; N pulse: 4 Mpps ngle-phase 4 Mp or: 200 Kpps				
nn Co	Command Source	External pulse / Internal registers								
ositio	Smoothing Method				Low-pass and	d P-curve filter				
P	Torque Limit				Paramete	er settings				
	Feed Forward Compensation				Paramete	er settings				



230V Servo drive specifications (continued)

	SureServo2 230V Drive Specifications Continued											
		Model	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00		
		Voltage Range		,		±10	VDC					
	Analog	Resolution				15	-bit					
	Command Input	Input Impedance				11	ΙΩ					
a.		Time Constant		25µs								
Speed Control Mode		Speed Control Range1				1:6	6000					
ntrol		Command Source			Exter	nal analog comm	and / Internal re	gisters				
од ре		Smoothing Method				Low-pass and	S-curve filter					
Spe		Torque Limit				Parameter settin	gs / Analog inpu	t				
		Bandwidth				Maximum 3.1 k	Hz (closed-loop)					
			±0.01% at 0% to 100% load fluctuation									
	S	peed Calibration Ratio2	±0.01% at ±10% power fluctuation									
		Voltage Dange	±0.01% at 0°C to 50°C ambient temperature fluctuation ±10VDC									
de	Analog	Voltage Range	1ΜΩ									
Torque Control Mode	Command Input	Input Impedance										
ontro		Time Constant					μs					
due C		Command Source			Exter	nal analog comm		gisters				
Tor		Smoothing Method					iss filter					
		Speed Limit		Maritani		Parameter settin		-	C - 40 E1			
		Analog Monitor Output	0		ignal can be set	71 (· /·		-10		
Digital Input/Output		Input	trigger, Torque	e limit, Speed lim	tch, Pulse clear, nit, Internal positi Speed / torque i , motor override, engage, Forward	on command sel mode switching, Forward / revers	ection, Motor sto vitching, Torque / position e limit, Original i	pp, Speed comm mode switching point, Forward / I	and selection, S _l , reverse operation	peed / position		
tal In							driver output					
Digi		Output	Servo ready, Servo on, Zero speed detection, Target speed reached, Target position reached, Torque Magnetic brake control, Homing completed, Early warning for overload, Servo warning, Position commi limit (reverse direction), Software limit (forward direction), Internal position command completed, Captur Servo procedure completed, Master position area of E-Cam.						on command overflows, Software			

 $^{{\}bf 1}\hbox{-} \hbox{Within the rated load, the speed ratio is: the minimum speed (smooth operation)} \ / \ rated \ speed.$

^{2 -} Within the rated speed, the speed calibration ratio is: (rotational speed with no load - rotational speed with full load) / rated speed.



230V Servo drive specifications (continued)

	Sui	eServo2	230V Dri	ve Specif	ications C	ontinued					
	Model	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00		
	Protection Function	speed deviation	STO (Category 3 / SIL 2), Overcurrent, Overvoltage, Undervoltage, Overheat, Regeneration error, Overload, Excessive speed deviation, Excessive position deviation, Encoder error, Adjustment error, Emergency stop, Forward / reverse limit error, Excessive deviation of full-closed loop control, Serial communication error, RST leak phase, Serial communication timeout, Short-circuit protection for terminals U, V, W and CN1, CN2, CN3								
	Communication Interface		R	S-485 / Modbus	RTU / USB / Op	tional EtherNet/	IP or Modbus TC	P			
	Weight [kg (lb)]	0.92 (2.03)	1.3 (2.87)	1.3 (2.87)	2.7 (5.95)	2.7 (5.95)	4.9 (10.8)	7.2 (15.9)	13 (29)		
	Installation Site	Indoors (avoid direct sunlight), no corrosive vapor (avoid fumes, flammable gases, and dust)									
	Altitude	Altitude 1000m or lower above sea level									
	Atmospheric Pressure	86kPa - 106kPa									
Environment	Operating Temperature	0°C to 55°C (If operating temperature is above 45°C, forced cooling is required)									
nviro	Storage Temperature				-20°C f	:o 65°C					
E	Humidity			U	nder 0 - 90% RH	(non-condensir	ng)				
	Vibration		Ç	9.80665 m/s2 (1	G) less than 20	Hz, 5.88 m/s2 (0	.6 G) 20 to 50 H	Z			
	IP Rating		IP20								
Power System TN system3,4											
	Approvals			IEC/EN	61800-5-1, UL 5	08C, TUV (for S	TO), CE				

^{3 -} TN system: the neutral point of the power system connects directly to the ground. The exposed metal components connect to the ground through the protective ground conductor.

^{4 -} Use a single-phase three-wire power system for the single-phase power model.



460V Servo drive specifications

		SureS	ervo2 460	OV Drive S	Specificat	ions					
	Model	SV2A-4040	SV2A-4075	SV2A-4150	SV2A-4200	SV2A-4300	SV2A-4550	SV2A-4750	SV2A-4F00		
	Price	\$460.00	\$485.00	\$665.00	\$700.00	\$840.00	\$1,050.00	\$1,365.00	\$1,830.00		
	Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	<u>PDF</u>		
	Power Rating	400W	750W	1.5 kW	2kW	3kW	5.5 kW	7.5 kW	15kW		
	Input Voltage		Three-phase 380–480 VAC, ±10%								
	Input Current 380–480 VAC 3-phase [Amps] rms	1.49	2.31	4.98	6.29	9.92	16.83	23.06	36.65		
	Continuous Output Current [Amps] rms	1.6	2.91	6.05	6.7	12.6	23.6	28.7	40.5		
Power	Max. Instantaneous Output Current [Amps] rms	5.4	9.7	13.94	21.35	30.46	47.5	57.69	95.3		
	Control Power Input Current	1.17	1.17	1.17	1.35	1.63	1.91	1.91	4.26		
	Main Circuit Inrush Current [Amps]	5.6	5.6	5.6	12.5	12.5	12.5	12.5	12.5		
	Control Circuit Inrush Current [Amps]	5	5	5	4.8	4.8	5.5	5.5	6		
	Control Circuit Voltage	24VDC									
	Cooling Method	Fan cooling									
	Encoder Resolution	24-bit (16777216 p/rev)									
	Main Circuit Control	SVPWM control									
	Control Mode	Manual/Auto									
	Regenerative Resistor	Built-in (ext	ernal options als	o available)		E	External (optiona	1)			
	Pulse Type			Pulse + Directi	on, CCW pulse -	CW pulse, A ph	nase + B phase				
Position Control Mode	Max. Input Pulse Frequency	Pulse + Direction: 4 Mpps; CCW pulse + CW pulse: 4 Mpps; A phase + B phase: single-phase 4 Mpps; Open collector: 200 Kpps									
ontro	Command Source				External pulse /	Internal registers	3				
ion C	Smoothing Method			Low-pa	ss, moving-aver	aging, and S-cur	ve filter				
Positi	E-Gear Ratio				times, limited to : 1–536870911 /						
	Torque Limit	Parameter settings									
	Feed Forward Compensation				Paramete	er settings					

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460V Servo drive specifications (continued)

		Su	reServo2	460V Dr	ive Speci	ications (Continued					
		Model	SV2A-4040	SV2A-4075	SV2A-4150	SV2A-4200	SV2A-4300	SV2A-4550	SV2A-4750	SV2A-4F00		
		Voltage Range				±10	VDC					
	Analog	Resolution	12-bit									
	Command Input	Input Impedance				1M	ΙΩ					
a a		Time Constant	25µs									
Speed Control Mode		Speed Control Range1				1:6	6000					
ntrol		Command Source			Exteri	nal analog comm	and / Internal re	gisters				
Smoothing Method						Low-pass and	S-curve filter					
Torque Limit						Parameter settin	gs / Analog inpu	t				
		Bandwidth				Maximum 3.1 kl	Hz (closed-loop)					
				±0.01% at 0% to 100% load fluctuation								
	S	peed Calibration Ratio2	±0.01% at ±10% power fluctuation									
			±0.01% at 0°C to 50°C ambient temperature fluctuation									
Je Je	Analog	Voltage Range	±10VDC									
/ Moc	Command Input	Input Impedance	9 1ΜΩ									
Torque Control Mode	,	Time Constant				25	μs					
ne C		Command Source			Exteri	nal analog comm	and / Internal re	gisters				
Torq		Smoothing Method				Low-pa	ss filter					
		Speed Limit				Parameter settin						
		Analog Monitor Output			gnal can be set l	• • • • • •		· ·				
Digital Input/Output		Input	trigger, Torque	e limit, Speed lim	nit, Internal positi Speed / torque r Emergency Stop	on command sel mode sy node switching, , Forward / rever	ection, Motor sto vitching, Forque / position se limit, Original	mode switching point, Forward	ntrol, Internal po and selection, Sp , reverse operation ction, Pulse inpu	peed / position on torque limit,		
tal In						A, B, Z line	driver output					
Digi		Output	Servo ready, Servo on, Zero speed detection, Target speed reached, Target position reached, Torque limiting, Servo alarm, Magnetic brake control, Homing completed, Early warning for overload, Servo warning, Position command overflows, Software limit (reverse direction), Software limit (forward direction), Internal position command completed, Capture procedure completed, Servo procedure completed, Master position area of E-Cam.									

^{1 -} Within the rated load, the speed ratio is: the minimum speed (smooth operation) / rated speed.

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^{2 -} Within the rated speed, the speed calibration ratio is: (rotational speed with no load - rotational speed with full load) / rated speed.



460V Servo drive specifications (continued)

	Sui	eServo2	460V Dri	ve Specifi	ications C	ontinued				
	Model	SV2A-4040	SV2A-4075	SV2A-4150	SV2A-4200	SV2A-4300	SV2A-4550	SV2A-4750	SV2A-4F00	
	Protection Function	position de	Overcurrent, Overvoltage, Undervoltage, Overheat, Regeneration error, Overload, Excessive speed deviation, Excessive position deviation, Encoder error, Adjustment error, Emergency stop, Forward / reverse limit error, Excessive deviation of full-closed loop control, Serial communication error, RST leak phase, Serial communication timeout, Short-circuit protection for terminals U, V, W and CN1, CN2, CN3							
	Communication Interface				RS-48	5 / USB				
	Weight [kg (lb)]	5.96 [13.1]	5.96 [13.1]	5.96 [13.1]	9.71 [21.4]	9.71 [21.4]	12.14 [26.8]	12.14 [26.8]	15.01 [33.1]	
	Installation Site	Indoors (avoid direct sunlight), no corrosive vapor (avoid fumes, flammable gases, and dust)								
	Altitude	1000m or lower above sea level								
	Atmospheric Pressure	86kPa – 106kPa								
Environment	Operating Temperature		(If operating temp	0°C to 55°C [3 perature is above		ooling is required	1)		
nviro	Storage Temperature				-20°C to 65°C	[-4°F to 149°F]				
E	Humidity				Under 90% RH (non-condensing)			
	Vibration		(9.80665 m/s2 (1	G) less than 20	Hz, 5.88 m/s2 (0	.6 G) 20 to 50 H	Z		
	IP Rating				IP	20				
	Power System				TN sys	stem ^{3,4}				
	Approvals	IEC/EN 61800-5-1, UL 508C, TUV (for STO), CE								

^{3 -} TN system: the neutral point of the power system connects directly to the ground. The exposed metal components connect to the ground through the protective ground conductor.

^{4 -} Use a single-phase three-wire power system for the single-phase power model.



Servo motor overview

24-bit Encoder Connector

1-foot cable with 9-position connector

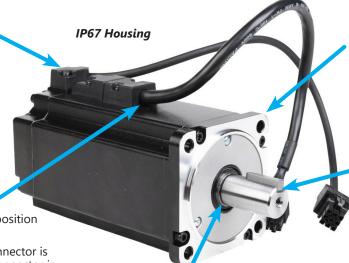
(Motor-mounted connector is IP67, end-of-cable connector is not liquid tight)

750W and below

Motor Power and Brake Connector

1-foot cable with 6-position connector

(Motor-mounted connector is IP67, end-of-cable connector is not liquid tight)



Low Inertia Motors

- 100W 40 mm flange
- 200W 60 mm flange
- 400W 60 mm flange
- 750W 80 mm flange

Keyed Shafts

- 100W 8 mm diameter
- 200W 14 mm diameter
- 400W 14 mm diameter
- 750W 19 mm diameter



With Shaft Seal (liquid tight)

> All SureServo2 motors have keyed shafts for use with servo-grade clamp or compression couplings (recommended) or servo-grade keyed couplings.

Motor Power and Brake Connector

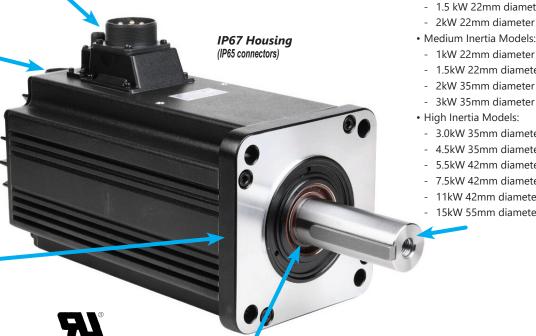
(Liquid tight when using AutomationDirect cables)

24-bit Encoder Connector (Liquid tight when using AutomationDirect cables)

1 kW and above

Low, Medium, and High **Inertia Motors**

- Low Inertia Model:
- 1kW 100mm flange
- 1.5 kW 130mm flange
- 2kW 130mm flange
- · Medium Inertia Models:
 - 1kW 130mm flange
- 1.5kW 130mm flange
- 2kW 180mm flange
- 3kW 180mm flange · High Inertia Models:
- 3.0kW 180mm flange
- 4.5kW 180mm flange
- 5.5kW 180mm flange
- 7.5kW 180mm flange
- 11kW 220mm flange
- 15kW 220mm flange



3kW 35mm diameter · High Inertia Models:

Keyed Shafts

 Low Inertia Model: - 1kW 22mm diameter 1.5 kW 22mm diameter

3.0kW 35mm diameter

2kW 22mm diameter

1kW 22mm diameter

1.5kW 22mm diameter 2kW 35mm diameter

- 4.5kW 35mm diameter
- 5.5kW 42mm diameter
- 7.5kW 42mm diameter
- 11kW 42mm diameter
- 15kW 55mm diameter

With Shaft Seal (liquid tight)



230V Low Inertia Motor Specifications

	7	230V Sur	eServo2	Low Ine	rtia Moto	r Specifi	cations			
Model	<u>SV2L-201N</u>	SV2L-201B	<u>SV2L-202N</u>	SV2L-202B	<u>SV2L-204N</u>	SV2L-204B	<u>SV2L-207N</u>	SV2L-207B	<u>SV2L-210N</u>	<u>SV2L-210B</u>
Price	\$286.00	\$419.00	\$315.00	\$465.00	\$340.00	\$479.00	\$364.00	\$510.00	\$477.00	\$702.00
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF
Rated Power [kW]	0.1	0.1	0.2	0.2	0.4	0.4	0.75	0.75	1.0	1.0
Rated Torque [N·m]Note 1	0.32	0.32	0.64	0.64	1.27	1.27	2.39	2.39	3.18	3.18
Max. Torque [N·m]	1.12	1.12	2.24	2.24	3.96	3.96	7.86	7.86	8.12	8.12
Rated Speed [rpm]		3000								
Max. Speed [rpm]		6000								00
Rated current [Amps] rms	0.9	0.9	4.5	8.04	8.04					
Max. Instantaneous Current [Amps] rms	3.3	3.3	5.4	5.4	8.56	8.56	15.41	15.41	20.16	20.16
Change of Rated Power [W/s]	16.3	14.90	16.4	14.60	35.8	33.60	37.8	34.40	38.2	30.40
Rotor Inertia [x10-4 kg m2]	0.0627	0.0689	0.25	0.28	0.45	0.48	1.51	1.66	2.65	3.33
Mechanical Time Constant [ms]	1.13	1.24	1.38	1.54	0.94	1.01	0.91	1.00	0.83	1.05
Torque Constant-KT [N-m/A]	0.356	0.356	0.441	0.441	0.488	0.488	0.531	0.531	0.396	0.396
Voltage Constant-KE [mV/ rpm]	13.66	13.66	16.4	16.4	17.2	17.2	18.7	18.7	16.8	16.8
Armature Resistance [Ohm]	8,34	8,34	3,8	3,8	1.68	1.68	0.57	0.57	0.20	0.20
Armature Inductance [mH]	9.85	9.85	8.15	8.15	4.03	4.03	2.2	2.2	1.81	1.81
Electrical Time Constant [ms]	1.18	1.18	2.14	2.14	2.40	2.40	3.86	3.86	9.05	9.05
Insulation Class					Class A (UL),	Class B (CE)				
Insulation Resistance					> 100MΩ	, 500VDC				
Insulation Strength					1.8 kVAC	, 1 second				
Weight [kg]	0.5	0.8	1.1	1.6	1.4	1.9	2.8	3.6	4.3	4.7
Max. Radial Loading [N]	78	78	245	245	245	245	392	392	490	490
Max. Axial Loading [N]	54	54	74	74	74	74	147	147	98	98
Brake Holding Torque [N·m (min)]Note 2		0.32		1.3		1.3		2.5		8
Brake Power Consumption (at 20°C) [W]	n/a	6.1	n/a	7.2	n/a	7.2	n/a	8	n/a	18.7
Brake Release Time [ms (max)]	II/a	20	II/a	20	II/a	20	II/a	20	II/a	10
Brake Pull-in Time [ms (max)]		35		50		50		60		70
Vibration Grade [µm]					V	15				
Operating Temperature [°C]		0–40 °C (32–104 °F)								
Storage Temperature [°C]		-10°C to 80°C (-14°F to 176°F)								
Operating Humidity		20–90% relative humidity (non-condensing)								
Storage Humidity				20–90	% relative humi		ensing)			
Vibration Capacity					2.5	5 G			IDGE (volume	ing water
IP Rating	IP67 (whe	IP67 (when using waterproof connectors and when an oil seal is fitted to the rotating shaft (for an oil seal model)) IP65 (when using waterproof connectors)								
Encoder Resolution					24-bit (1677					
Agency Approvals					_C UR _L	_{IS} , CE				

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating termperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability). Note 2–The built-in servo motor brake is only for holding the load in a stopped state. Do not use for deceleration or as a dynamic brake.

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230V Medium Inertia Motor Specifications

	230V	SureServo	2 Medium	Inertia Mo	tor Specifi	cations					
Model	SV2M-210N	SV2M-210B	<u>SV2M-215N</u>	<u>SV2M-215B</u>	<u>SV2M-220N</u>	SV2M-220B	SV2M-230N	SV2M-230B			
Price	\$497.00	\$711.00	\$537.00	\$795.00	\$718.00	\$953.00	\$859.00	\$1,107.00			
Drawing	PDF	PDF	PDF	<u>PDF</u>	PDF	PDF	PDF	PDF			
Rated Power [kW]	1.0	1.0	1.5	1.5	2.0	2.0	3.0	3.0			
Rated Torque [N·m]Note 1	4.77	4.77	7.16	7.16	9.55	9.55	17.55	17.55			
Max. Torque [N·m]	<i>Max. Torque [N·m]</i> 14.32 14.32 14.88 14.88						48.29	48.29			
Rated Speed [rpm]			20	00			17	00			
Max. Speed [rpm]		3000									
Rated current [Amps] rms	5.66	5.66 5.66 8.33 8.33 12.1 12.1 17.9									
Max. Instantaneous Current [Amps] rms	19.73	19.73	20.16	20.16	33.66	33.66	55.93	55.93			
Change of Rated Power [W/s]	27.1	24.90	45.8	43.10	26.3	24.10	56.0	53.90			
Rotor Inertia [x10-4 kg m2]	8.41	9.14	11.2	11.9	34.7	37.8	55	57.1			
Mechanical Time Constant [ms]	1.54	1.67	1.12	1.18	1.75	1.90	1.29	1.34			
Torque Constant-KT [N-m/A]	0.843	0.843	0.860	0.860	0.789	0.789	0.980	0.980			
Voltage Constant-KE [mV/ rpm]	31.9	31.9	31.8	31.8	31.4	31.4	35	35			
Armature Resistance [Ohm]	0.47	0.47	0.26	0.26	0.119	0.119	0.077	0.077			
Armature Inductance [mH]	5.99	5.99	4.01	4.01	2.84	2.84	1.27	1.27			
Electrical Time Constant [ms]	12.74	12.74	15.42	15.42	23.87	23.87	16.49	16.49			
Insulation Class				Class A (UL),	Class B (CE)						
Insulation Resistance				> 100MΩ	, 500VDC						
Insulation Strength				1.8 kVAC,							
Weight [kg]	7.0	8.4	7.5	8.9	13.5	17.5	18.5	22.5			
Max. Radial Loading [N]		49			11		l .	70			
Max. Axial Loading [N]		9	8			49	90	Г			
Brake Holding Torque [N·m (min)]Note 2		10		10		25		25			
Brake Power Consumption (at 20°C) [W]	n/a	19	n/a	19	n/a	20.4	n/a	20.4			
Brake Release Time [ms (max)]	11/4	10	11/4	10	11/4	10	11/4	10			
Brake Pull-in Time [ms (max)]		70		70		70		70			
Vibration Grade [μm]				V.	15						
Operating Temperature [°C]		0–40 °C (32–104 °F)									
Storage Temperature [°C]	-10°C to 80°C (-14°F to 176°F)										
Operating Humidity			20-	-90% relative humi	dity (non-condensi	ng)					
Storage Humidity			20-	-90% relative humi	dity (non-condensi	ng)					
Vibration Capacity				2.5							
IP Rating			IF	65 (when using wa		s)					
Encoder Resolution	24-bit (16777216 p/rev)										
Agency Approvals				cURu	_S , CE						

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability). Note 2–The built-in servo motor brake is only for holding the load in a stopped state. Do not use for deceleration or as a dynamic brake.



230V High Inertia Motor Specifications

	2	30V Sure	Servo2	High Ine	tia Moto	r Specifi	cations									
Model	SV2H-245N	SV2H-245B	SV2H-255N	SV2H-255B	SV2H-275N	SV2H-275B	SV2H-2BON	SV2H-2B0B	SV2H-2F0N	SV2H-2F0B						
Price	\$1,110.00	\$1,721.00	\$1,329.00	\$1,984.00	\$1,652.00	\$2,581.00	\$2,602.00	\$3,568.00	\$3,004.00	\$4,113.00						
Drawing	PDF	PDF	PDF	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	PDF						
Rated Power [kW]	4.5	4.5	5.5	5.5	7.5	7.5	11	11	15	15						
Rated Torque [N·m]Note 1	28.65	28.65	35.01	35.01	47.74	47.74	70	70	95.4	95.4						
Max. Torque [N·m]	71.62	71.62	87.53	87.53	119.36	119.36	175	175	224.0	224.0						
Rated Speed [rpm]	1500															
Max. Speed [rpm]			30	00			2000									
Rated current [Amps] rms	32.5	32.5	40.12	40.12	47.5	47.5	51.1	51.1	67	67						
Max. Instantaneous Current [Amps] rms	91.4	91.4	108.0	108.0	127.46	127.46	129.5	129.5	162	162						
Change of Rated Power [W/s]	105.6	101.8	122.8	119.3	159.7	156.6	145.0	141.4	201.8	197.1						
Rotor Inertia [x10-4 kg m2]	77.75	80.65	99.78	102.70	142.7	145.55	338	346.5	451	461.8						
Mechanical Time Constant [ms]	0.93	0.96	0.97	0.99	0.84	0.85	1.38	1.41	1.22	1.25						
Torque Constant-KT [N·m/A]	0.878	0.878	0.873	0.873	1.005	1.005	1.370	1.370	1.424	1.424						
Voltage Constant-KE [mV/rpm]	32.0	32.0	31.0	31.0	35.5	35.5	49	49	50	50						
Armature Resistance [Ohm]	0.032	0.032	0.025	0.025	0.02	0.02	0.0261	0.0261	0.0184	0.0184						
Armature Inductance [mH]	0.89	0.89	0.71	0.71	0.6	0.6	0.65	0.65	0.48	0.48						
Electrical Time Constant [ms]	27.81	27.81	28.4	28.4	30.0	30.0	24.9	24.9	26.09	26.09						
Insulation Class			Class A (UL),	Class B (CE)				Class F (UL),	Class F (CE)							
Insulation Resistance					> 100MΩ	, 500VDC										
Insulation Strength						, 1 second	T			T						
Weight [kg]	23.5	29	30.5	36	40.5	46	56.4	68.4	75	87						
Max. Radial Loading [N]		70			64			33								
Max. Axial Loading [N]	49	90		5	88			11	00							
Brake Holding Torque [N·m (min)]Note 2		55.0		55.0		55.0		115	_	115						
Brake Power Consumption (at 20°C) [W]	n/a	n/a	19.9	n/a	19.9	n/a	19.9	n/a	28.8	n/a	28.8					
Brake Release Time [ms (max)]	.,,	10	.,,	10		10	_	10	- 11/A	10						
Brake Pull-in Time [ms (max)]		70		70		70		70		70						
Vibration Grade [µm]					V	15										
Operating Temperature [°C]					0–40 °C (3	32–104 °F)										
Storage Temperature [°C]				-	10°C to 80°C (-14°F to 176°F										
Operating Humidity					% relative humi	, ,										
Storage Humidity	20–90% relative humidity (non-condensing)															
Vibration Capacity	2.5 G															
IP Rating	IP65 (when using waterproof connectors and when an oil seal is fitted to the rotating shaft (for an oil seal model))															
Encoder Resolution	24-bit (16777216 p/rev)															
Agency Approvals					cUR	_{JS} , CE			_C UR _{US} , CE							

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions:

300mm x 300mm x 12mm

400mm x 400mm x 20mm

550mm x 550mm x 30mm

All made from aluminum (or mounted to equipment with an equivalent heat sinking capability)

Note 2-The built-in servo motor brake is only for holding the load in a stopped state. Do not use it for deceleration or as a dynamic brake.



460V Low Inertia Motor Specifications

460V SureServo2 Low Inertia Motor Specifications										
Model	<u>SV2L-404N</u>	SV2L-404B	<u>SV2L-407N</u>	SV2L-407B	<u>SV2L-410N</u>	<u>SV2L-410B</u>	<u>SV2L-415N</u>	<u>SV2L-415B</u>	<u>SV2L-420N</u>	<u>SV2L-420B</u>
Price	\$360.00	\$515.00	\$388.00	\$555.00	\$505.00	\$745.00	\$580.00	\$855.00	\$775.00	\$1,015.00
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF
Rated Power [kW]	0.4	0.4	0.75	0.75	1.0	1.0	1.5	1.5	2.0	2.0
Rated Torque [N·m]Note 1	1.27	1.27	2.24	2.24	3.18	3.18	7.16	7.16	9.55	9.55
Max. Torque [N·m]	4.45	4.45	7.58	7.58	9.54	9.54	18.1	18.1	28.65	28.65
Rated Speed [rpm]	30	3000 3200 3000 2000								
Max. Speed [rpm]	6000 6000			00	50	00		3000		
Rated current [Amps] rms	1.43	1.43	2.90	2.90	4.36	4.36	5.1	5.1	6.7	6.7
Max. Instantaneous Current [Amps] rms	5.25	5.25	9.70	9.70	13.74	13.74	13.28	13.28	21.35	21.35
Change of Rated Power [W/s]	35.8	33.6	33.2	30.2	38.2	30.40	45.9	43.10	62.5	57.4
Rotor Inertia [x10-4 kg m2]	0.45	0.48	1.51	1.66	2.65	3.33	11.18	11.9	14.59	15.88
Mechanical Time Constant [ms]	1.05	1.12	1.02	1.12	0.81	1.02	1.26	1.34	1.11	1.21
Torque Constant-KT [N-m/A]	0.888	0.888	0.772	0.772	0.729	0.729	1.404	1.404	1.425	1.425
Voltage Constant-KE [mV/ rpm]	31.83	31.83	27.83	27.83	29.00	29.00	55.00	55.00	55.00	55.00
Armature Resistance [Ohm]	6.28	6.28	1.38	1.38	0.617	0.617	0.83	0.83	0.57	0.57
Armature Inductance [mH]	13.34	13.34	4.78	4.78	6.03	6.03	11.67	11.67	8.29	8.29
Electrical Time Constant [ms]	2.12	2.12	3.46	3.46	9.77	9.77	14.06	14.06	14.54	14.54
Insulation Class					Class A (UL),	Class B (CE)				
Insulation Resistance					> 100 MΩ	, 500VDC				
Insulation Strength					2.3 kVA	C, 1 sec				
Weight [kg]	1.4	1.9	2.8	3.6	4.3	4.7	7.5	8.9	7.8	9.2
Max. Radial Loading [N]	245	245	392	392	490	490	490	490	490	490
Max. Axial Loading [N]	74	74	147	147	98	98	98	98	98	98
Brake Holding Torque [N·m (min)]Note 2		1.3		2.5		8	10 19 n/a 10	10		10
Brake Power Consumption (at 20°C) [W]	n/a	7.2	n/a	8	n/a	18.7		n/a	19	
Brake Release Time [ms (max)]	11/4	20	11/4	20	II/a	10		10	.,, α	10
Brake Pull-in Time [ms (max)]		50		60		70		70		70
Vibration Grade [µm]					V	15				
Operating Temperature [°C]					0–40 °C (3					
Storage Temperature [°C]					-10°C to 80°C (-
Operating Humidity					% relative humi					
Storage Humidity Vibration Capacity		20–90% relative humidity (non-condensing)								
IP Rating		2.5 G IP67 (when using waterproof connectors and when an oil seal is fitted to the rotating shaft (for an oil seal model)) IP65 (when using waterproof connectors and when an oil seal is fitted to the rotating shaft (for an oil seal model))								
Encoder Resolution	seal is fitted to the rotating shaft (for an oil seal model)) (for an oil seal model)) 24-bit (16777216 p/rev)									
Agency Approvals		` ' '								
нуспсу нрргочать	_C UR _{US} , CE									

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

Note 2–The built-in servo motor brake is only for holding the load in a stopped state. Do not use for deceleration or as a dynamic brake.

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460V Medium Inertia Motor Specifications

460V SureServo2 Medium Inertia Motor Specifications							
Model	<u>SV2M-410N</u>	<u>SV2M-410B</u>					
Price	\$530.00	\$765.00					
Drawing	PDF	<u>PDF</u>					
Rated Power [kW]	1.0	1.0					
Rated Torque [N·m]Note 1	4.77	4.77					
Max. Torque [N·m]	14.32	14.32					
Rated Speed [rpm]	20	00					
Max. Speed [rpm]	30	00					
Rated current [Amps] rms	3.6	3.6					
Max. Instantaneous Current [Amps] rms	11.41	11.41					
Change of Rated Power [W/s]	27.1	24.90					
Rotor Inertia [x10-4 kg m2]	8.41	9.14					
Mechanical Time Constant [ms]	1.85	2.01					
Torque Constant-KT [N-m/A]	1.325	1.325					
Voltage Constant-KE [mV/rpm]	53.20	53.20					
Armature Resistance [Ohm]	1.477	1.477					
Armature Inductance [mH]	17.79	17.79					
Electrical Time Constant [ms]	12.04	12.04					
Insulation Class	Class A (UL),	Class B (CE)					
Insulation Resistance	> 100 MΩ	, 500VDC					
Insulation Strength	2.3 kVAC, 1 sec						
Weight [kg]	7.0 8.4						
Max. Radial Loading [N]	490						
Max. Axial Loading [N]	98						
Brake Holding Torque [N·m (min)]Note 2		10					
Brake Power Consumption (at 20°C) [W]	n/a	19					
Brake Release Time [ms (max)]		10					
Brake Pull-in Time [ms (max)]		70					
Vibration Grade [µm]	-						
Operating Temperature [°C]	0–40 °C (32–104 °F)						
Storage Temperature [°C]	-10°C to 80°C (-14°F to 176°F)						
Operating Humidity	20–90% relative humidity (non-condensing)						
Storage Humidity	20–90% relative humidity (non-condensing)						
Vibration Capacity	2.5 G						
IP Rating	IP65 (when using waterproof connectors and when an oil seal is fitted to th rotating shaft (for an oil seal model))						
Encoder Resolution	24-bit (1677	7216 p/rev)					
Agency Approvals	cUR _U	s, CE					
Note 4. The noted to make is the continuous normically	1000 and 1000						

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions: 250mm x 250mm x 6mm made from aluminum (or mounted to equipment with an equivalent heat sinking capability).

Note 2-The built-in servo motor brake is only for holding the load in a stopped state. Do not use for deceleration or as a dynamic brake.



460V High Inertia Motor Specifications

460V SureServo2 High Inertia Motor Specifications										
Model	SV2H-430N	SV2H-430B	SV2H-445N	SV2H-445B	SV2H-455N	SV2H-455B				
Price	\$985.00	\$1,200.00	\$1,170.00	\$1,820.00	\$1,405.00	\$2,095.00				
Drawing	PDF	PDF	PDF	PDF	PDF	PDF				
Rated Power [kW]	3.0	3.0	4.5	4.5	5.5	5.5				
Rated Torque [N·m]Note 1	19.1	19.1	28.65	28.65	35	35				
Max. Torque [N·m]	49.38	49.38	64.61	64.61	73.48	73.48				
Rated Speed [rpm]		1500								
Max. Speed [rpm]	3000									
Rated current [Amps] rms	12.2	12.2	21.9	21.9	23.6	23.6				
Max. Instantaneous Current [Amps] rms	30.46	30.46	47.5	47.5	47.5	47.5				
Change of Rated Power [W/s]	66.4	63.9	105.6	101.8	122.8	119.3				
Rotor Inertia [x10-4 kg m2]	54.95	57.1	77.75	80.65	99.78	80.65				
Mechanical Time Constant [ms]	1.20	1.24	1.06	1.10	0.84	0.86				
Torque Constant-KT [N·m/A]	1.566	1.566	1.308	1.308	1.483	1.483				
Voltage Constant-KE [mV/rpm]	64.4	64.4	53.00	53.00	58.9	58.9				
Armature Resistance [Ohm]	0.21	0.21	0.09	0.09	0.07	0.07				
Armature Inductance [mH]	4.94	4.94	2.36	2.36	2.20	2.20				
Electrical Time Constant [ms]	23.52	23.52	26.22	26.22	31.43	31.43				
Insulation Class	Class A (UL), Class B (CE)									
Insulation Resistance	> 100 MΩ, 500VDC									
Insulation Strength	2.3 kVAC, 1 sec									
Weight [kg]	18.5	22.5	23.5	29	30.5	36				
Max. Radial Loading [N]			70		17					
Max. Axial Loading [N]		4:	90	Г	58	38				
Brake Holding Torque [N·m (min)]Note 2		25	n/a	55	n/a	55				
Brake Power Consumption (at 20°C) [W]		20.4		19.9		19.9				
Brake Release Time [ms (max)]	n/a	10		10		10				
Brake Pull-in Time [ms (max)]		70		70		70				
Vibration Grade [µm]			V	15						
Operating Temperature [°C]			0–40 °C (3	32–104 °F)						
Storage Temperature [°C]			-10°C to 80°C (-14°F to 176°F)						
Operating Humidity		20	0–90% relative humi	dity (non-condensin	g)					
Storage Humidity		20	0–90% relative humi		g)					
Vibration Capacity			2.5							
IP Rating	IP65 (when using	g waterproof connec	tors and when an o		rotating shaft (for a	n oil seal model))				
Encoder Resolution	24-bit (16777216 p/rev)									
Agency Approvals	Agency Approvals _C UR _{US} , CE									
Continued on next page										

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions:

300mm x 300mm x 12mm

400mm x 400mm x 20mm

550mm x 550mm x 30mm

All made from aluminum (or mounted to equipment with an equivalent heat sinking capability)

Note 2-The built-in servo motor brake is only for holding the load in a stopped state. Do not use it for deceleration or as a dynamic brake.

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460V High Inertia Motor Specifications, continued

460V SureServo2 High Inertia Motor Specifications								
Model	<u>SV2H-475N</u>	SV2H-475B	SV2H-4B0N	SV2H-4B0B	SV2H-4F0N	<u>SV2H-4F0B</u>		
Price	\$1,745.00	\$2,730.00	\$2,750.00	\$3,770.00	\$3,175.00	\$4,345.00		
Drawing	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>		
Rated Power [kW]	7.5	7.5	11	11	15	15		
Rated Torque [N·m]Note 1	47.74	47.74	70	70	95.4	95.4		
Max. Torque [N·m]	93.71	93.71	175	175	224.0	224.0		
Rated Speed [rpm]	15	00	1500					
Max. Speed [rpm]	30	00		20	000			
Rated current [Amps] rms	28.7	28.7	26.8	26.8	37.5	37.5		
Max. Instantaneous Current [Amps] rms	57.69	57.69	67.7	67.7	95.3	95.3		
Change of Rated Power [W/s]	159.7	156.6	145.0	141.4	201.8	197.1		
Rotor Inertia [x10-4 kg m2]	142.7	145.5	338	346.5	451	461.8		
Mechanical Time Constant [ms]	0.81	0.83	1.40	1.44	1.21	1.23		
Torque Constant-KT [N·m/A]	1.663	1.663	2.612	2.612	2.544	2.544		
Voltage Constant-KE [mV/rpm]	66.40	66.40	96.00	96.00	83.90	83.90		
Armature Resistance [Ohm]	0.06	0.06	0.0994	0.0994	0.0545	0.0545		
Armature Inductance [mH]	1.70	1.70	2.51	2.51	1.43	1.43		
Electrical Time Constant [ms]	28.33	28.33	25.25	25.25	26.24	26.24		
Insulation Class	Class A (UL), Class B (CE) Class F (UL), Class F (CE)							
Insulation Resistance			> 100 MΩ	2, 500VDC				
Insulation Strength			2.3 kVA	C, 1 sec				
Weight [kg]	40.5	46	56.4	68.4	75	87		
Max. Radial Loading [N]	17	64		33	00			
Max. Axial Loading [N]	58	38		11	00			
Brake Holding Torque [N·m (min)]Note 2		55		115		115		
Brake Power Consumption (at 20°C) [W]		19.9	n/a	28.8	n/a	28.8		
Brake Release Time [ms (max)]	n/a	10		10		10		
Brake Pull-in Time [ms (max)]		70		70		70		
Vibration Grade [µm]			V	15				
Operating Temperature [°C]	0-40 °C (32-104 °F)							
Storage Temperature [°C]			-10°C to 80°C (-14°F to 176°F)				
Operating Humidity		20)-90% relative hum	dity (non-condensir	ng)			
Storage Humidity	20–90% relative humidity (non-condensing)							
Vibration Capacity								
IP Rating	IP65 (when using	waterproof connec	tors and when an o	il seal is fitted to the	rotating shaft (for a	in oil seal model))		
Encoder Resolution	24-bit (16777216 p/rev)							
Agency Approvals	_C UR _{US} , CE							

Note 1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions:

300mm x 300mm x 12mm

400mm x 400mm x 20mm

550mm x 550mm x 30mm

All made from aluminum (or mounted to equipment with an equivalent heat sinking capability)

Note 2-The built-in servo motor brake is only for holding the load in a stopped state. Do not use it for deceleration or as a dynamic brake.

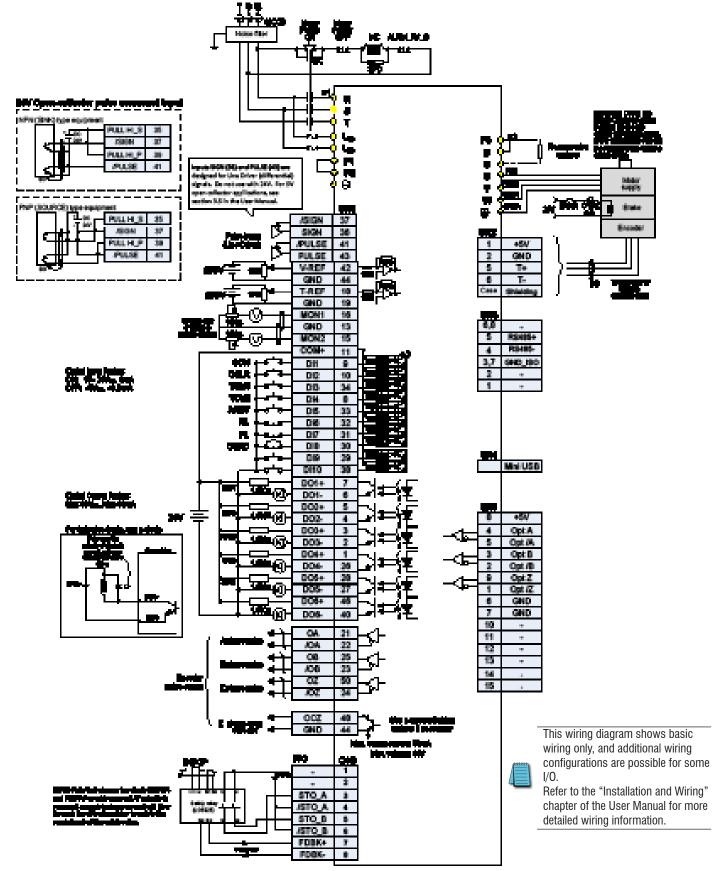
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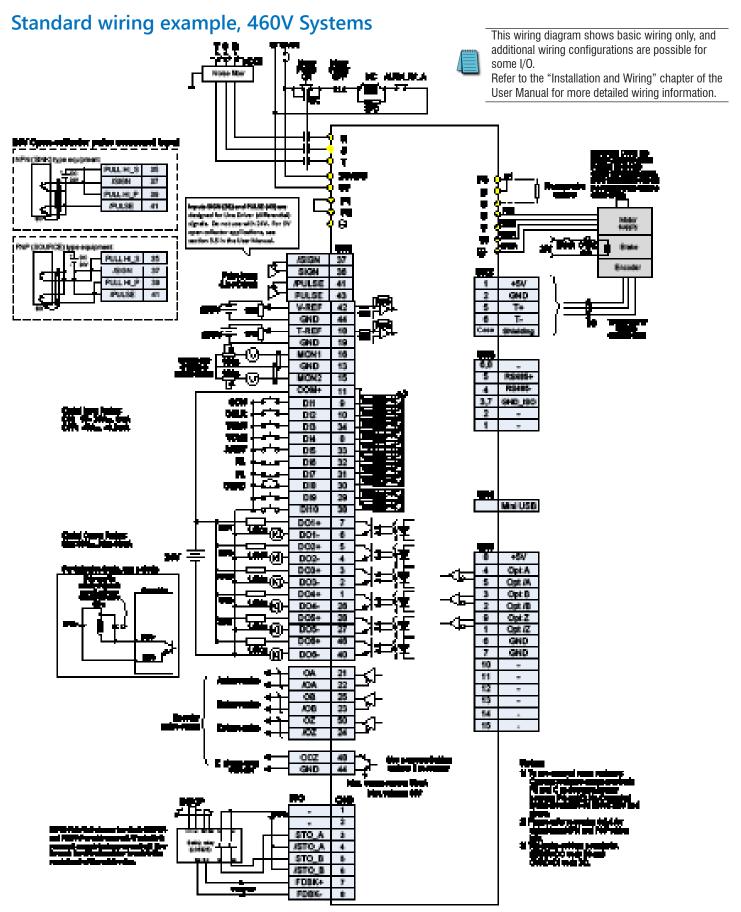


AC Servo System Wiring

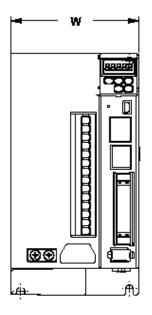
Standard wiring example, 230V Systems

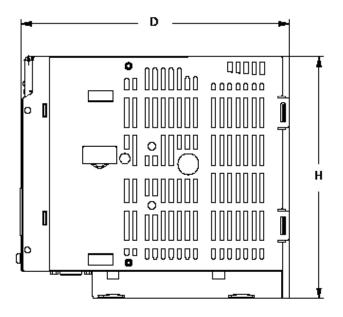


AC Servo System Wiring



Servo drive dimensions





S	ureServo2	Drive Dime	nsions	
Model	Drawing Link	W mm [inches]	D mm [inches]	H mm [inches]
SV2A-2040	<u>PDF</u>	35 [1.38]	170 [6.69]	170 [6.69]
SV2A-2075	<u>PDF</u>	50 [1.97]	180 [7.09]	180 [7.09]
SV2A-2150	<u>PDF</u>	50 [1.97]	180 [7.09]	180 [7.09]
SV2A-2200	<u>PDF</u>	95 [3.74]	200 [7.87]	180 [7.09]
SV2A-2300	<u>PDF</u>	95 [3.74]	200 [7.87]	180 [7.09]
SV2A-2550	<u>PDF</u>	120 [4.72]	206 [8.12]	273 [10.75]
SV2A-2750	<u>PDF</u>	141 [5.56]	226 [8.90]	312 [12.28]
SV2A-2F00	<u>PDF</u>	186 [7.32]	281 [11.08]	390 [15.35]
<u>SV2A-4040</u>	<u>PDF</u>	65 [2.55]	204 [8.03]	180 [7.09]
SV2A-4075	<u>PDF</u>	65 [2.55]	204 [8.03]	180 [7.09]
<u>SV2A-4150</u>	<u>PDF</u>	65 [2.55]	204 [8.03]	180 [7.09]
SV2A-4200	<u>PDF</u>	110 [4.33]	200.8 [7.9]	260 [10.24]
SV2A-4300	<u>PDF</u>	110 [4.33]	200.8 [7.9]	260 [10.24]
<u>SV2A-4550</u>	<u>PDF</u>	110 [4.33]	200.8 [7.9]	260 [10.24]
SV2A-4750	<u>PDF</u>	120 [4.72]	206.3 [8.12]	273 [10.75]
<u>SV2A-4F00</u>	<u>PDF</u>	141 [5.55]	225.5 [8.88]	312 [12.28]



For additional dimensions, see the AutomationDirect website or click on the drawing links.

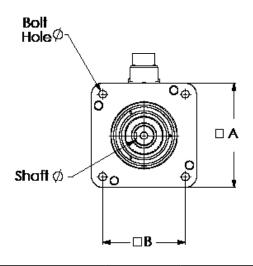


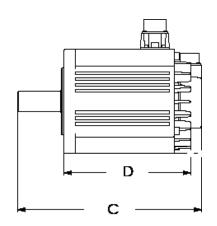
Requires 2" above and below the drive for air flow. For proper air flow clearance, please see section 2.3.1 of the SureServo2 User Manual.



For cabinet depth, add approximately 100mm (4 inches) for CN1 (I/O) and CN2 (encoder) cable bend radius.

230V Servo motor dimensions





		SureServo	2 230V Mo	tor Dimens	ions		
Model	Drawing Link	A mm [inches]	B mm [inches]	C mm [inches]	D mm [inches]	Bolt Hole Ø mm [inches]	Shaft Ø mm [inches]
<u>SV2L-201N</u>	PDF	40.0 [1.57]	32.2 [1.27]	110.3 [4.34]	85.3 [3.36]	4.5 [0.18]	8.0 [0.31]
<u>SV2L-201B</u>	PDF	40.0 [1.57]	32.2 [1.27]	145.1 [5.71]	120.1 [4.73]	4.5 [0.18]	8.0 [0.31]
<u>SV2L-202N</u>	PDF	60.0 [2.36]	49.5 [1.95]	113.9 [4.49]	84.0 [3.31]	5.5 [0.22]	14.0 [0.55]
<u>SV2L-202B</u>	<u>PDF</u>	60.0 [2.36]	49.5 [1.95]	147.6 [5.81]	117.1 [4.61]	5.5 [0.22]	14.0 [0.55]
<u>SV2L-204N</u>	<u>PDF</u>	60.0 [2.36]	49.5 [1.95]	136.0 [5.35]	106.0 [4.17]	5.5 [0.22]	14.0 [0.55]
<u>SV2L-204B</u>	<u>PDF</u>	60.0 [2.36]	49.5 [1.95]	169.7 [6.68]	139.7 [5.50]	5.5 [0.22]	14.0 [0.55]
<u>SV2L-207N</u>	<u>PDF</u>	80.0 [3.15]	63.6 [2.51]	155.8 [6.13]	115.8 [4.56]	6.6 [2.51]	19.0 [0.75]
<u>SV2L-207B</u>	<u>PDF</u>	80.0 [3.15]	63.6 [2.51]	193.2 [7.61]	153.2 [6.03]	6.6 [2.51]	19.0 [0.75]
<u>SV2L-210N</u>	<u>PDF</u>	100.0 [3.94]	81.3 [3.20]	198.3 [7.81]	110.2 [4.34]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-210B</u>	<u>PDF</u>	100.0 [3.94]	81.3 [3.20]	237.5 [9.35]	149.5 [5.89]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-210N</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	202.5 [7.97]	104.5 [4.11]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-210B</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	238.5 [9.39]	140.5 [5.53]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-215N</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	222.5 [8.76]	120.5 [4.74]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-215B</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	257.0 [10.12]	155.0 [6.10]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-220N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	247.7 [9.75]	150.0 [5.91]	13.5 [0.53]	35.0 [1.38]
<u>SV2M-220B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	281.8 [11.09]	184.1 [7.25]	13.5 [0.53]	35.0 [1.38]
<u>SV2M-230N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	280.8 [11.06]	183.1 [7.21]	13.5 [0.53]	35.0 [1.38]
<u>SV2M-230B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	314.0 [12.36]	216.3 [8.52]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-245N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	314.0 [12.36]	216.3 [8.52]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-245B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	358.0 [14.09]	260.3 [10.25]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-255N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	392.4 [15.45]	260.7 [10.26]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-255B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	424.4 [16.71]	292.7 [11.52]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-275N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	454.70 [17.9]	323.0 [12.72]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-275B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	488.8 [19.24]	357.1 [14.06]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-2B0N</u>	<u>PDF</u>	219.9 [8.66]	166.2 [6.54]	487.4 [19.19]	319.0 [12.56]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-2B0B</u>	<u>PDF</u>	219.9 [8.66]	166.2 [6.54]	550.4 [21.67]	382.0 [15.04]	13.5 [0.53]	42.0 [1.63]
<u>SV2H-2F0N</u>	<u>PDF</u>	219.9 [8.66]	166.2 [6.54]	566.4 [22.30]	398.0 [15.67]	13.5 [0.53]	55.0 [2.17]
<u>SV2H-2F0B</u>	<u>PDF</u>	219.9 [8.66]	166.2 [6.54]	629.4 [24.78]	461.0 [18.15]	13.5 [0.53]	55.0 [2.17]

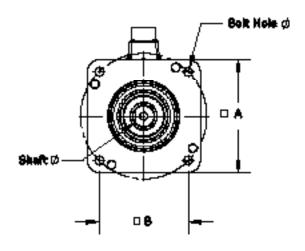


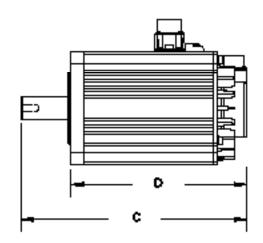
NOTE: Motor cables are approximately 304mm (12") in length.



For additional dimensions, see the AutomationDirect website or click on the drawing links.

460V Servo motor dimensions





		SureServo	2 460V Mo	tor Dimens	ions		
Model	Drawing Link	A mm [inches]	B mm [inches]	C mm [inches]	D mm [inches]	Bolt Hole Ø mm [inches]	Shaft Ø mm [inches]
SV2L-404N	<u>PDF</u>	60.0 [2.36]	49.5 [1.95]	136.0 [5.35]	106.0 [4.17]	5.5 [0.22]	14.0 [0.55]
SV2L-404B	<u>PDF</u>	60.0 [2.36]	49.5 [1.95]	169.7 [6.68]	139.7 [5.50]	5.5 [0.22]	14.0 [0.55]
<u>SV2L-407N</u>	PDF	80.0 [3.15]	63.6 [2.51]	155.8 [6.13]	115.8 [4.56]	6.6 [0.26]	19.0 [0.75]
<u>SV2L-407B</u>	<u>PDF</u>	80.0 [3.15]	63.6 [2.51]	193.2 [7.61]	153.2 [6.03]	6.6 [0.26]	19.0 [0.75]
<u>SV2L-410N</u>	PDF	100.0 [3.94]	81.3 [3.20]	198.2 [7.81]	153.2 [6.03]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-410B</u>	<u>PDF</u>	100.0 [3.94]	81.3 [3.20]	237.5 [9.35]	192.5 [7.58]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-415N</u>	PDF	130.0 [5.12]	102.5 [4.04]	222.5 [8.76]	167.5 [6.59]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-415B</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	257.0 [10.12]	202.0 [7.95]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-420N</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	242.5 [9.55]	187.5 [7.38]	9.0 [0.35]	22.0 [0.87]
<u>SV2L-420B</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	271.0 [10.67]	216.0 [8.50]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-410N</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	202.5 [7.97]	147.5 [5.81]	9.0 [0.35]	22.0 [0.87]
<u>SV2M-410B</u>	<u>PDF</u>	130.0 [5.12]	102.5 [4.04]	238.5 [9.39]	183.5 [7.22]	9.0 [0.35]	22.0 [0.87]
<u>SV2H-430N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	280.8 [11.06]	201.8 [7.94]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-430B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	314.0 [12.36]	235.0 [9.25]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-445N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	314.0 [12.36]	235.0 [9.25]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-445B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	358.0 [14.09]	279.0 [10.98]	13.5 [0.53]	35.0 [1.38]
<u>SV2H-455N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	392.4 [15.45]	279.4 [11.00]	13.5 [0.53]	42.0 [1.65]
<u>SV2H-455B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	424.4 [16.71]	311.4 [12.26]	13.5 [0.53]	42.0 [1.65]
<u>SV2H-475N</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	454.7 [17.90]	341.7 [13.45]	13.5 [0.53]	42.0 [1.65]
<u>SV2H-475B</u>	<u>PDF</u>	180.0 [7.09]	141.4 [5.57]	488.8 [19.24]	375.8 [14.80]	13.5 [0.53]	42.0 [1.65]
<u>SV2H-4B0N</u>	<u>PDF</u>	220.0 [8.66]	166.2 [6.54]	487.4 [19.19]	371.4 [14.62]	13.5 [0.53]	42.0 [1.65]
<u>SV2H-4B0B</u>	<u>PDF</u>	220.0 [8.66]	166.2 [6.54]	550.4 [21.67]	434.4 [17.10]	13.5 [0.53]	42.0 [1.65]
SV2H-4F0N	<u>PDF</u>	220.0 [8.66]	166.2 [6.54]	566.4 [22.30]	450.4 [17.73]	13.5 [0.53]	55.0 [2.17]
<u>SV2H-4F0B</u>	<u>PDF</u>	220.0 [8.66]	166.2 [6.54]	629.4 [24.78]	513.4 [20.21]	13.5 [0.53]	55.0 [2.17]



NOTE: Motor cables are approximately 304mm (12") in length.



For additional dimensions, see the AutomationDirect website or click on the drawing links.

Accessories

CN1 Accessories

The terminal block module and direct mount feedthrough module allow for I/O connections to a SureServo2 drive.

Option 1:

Select an SV2-CN1-CBL50 cable (3 lengths available) and the DIN rail mount SV2-CN1-RTB50 Remote Terminal Block for access to all 50 of the drive's digital and analog I/O signals.

Option 2:

Select the SV2-CN1-LTB20 Local Terminal Block. The LTB20 can be used in many applications and allows connection to the most frequently-used I/O: High speed line driver pulse inputs (Pulse and Direction, AB Quad, etc.), (5) Digital Inputs, (4) Digital Outputs, and the Z-pulse open collector output.



SV2-CN1-RTB50

Part Number	Price	Description	Cable Length	Drawing	Compatible Drives
SV2-CN1-RTB50	\$58.00	SureServo2 feedthrough module, 50-pole, DIN rail mount	ı	<u>PDF</u>	
SV2-CN1-CBL50	\$71.00	SureServo2 CN1 I/O	0.5 m	_	All
SV2-CN1-CBL50-1	\$75.00	control cable with	1m		
SV2-CN1-CBL50-2	\$79.00	mating connectors	2m		
SV2-CN1-LTB20	\$43.00	SureServo2 feedthrough module, 20-pole, direct mount	-	<u>PDF</u>	



3V2-CN 1-L1 DZU

Communication Modules

SureServo2 drives can also make use of optional communication cards. Both EtherNet/IP and Modbus TCP cards are available. Field upgradeable firmware ensures that the cards can always be kept current.

ModBus TCP

The SV2-CM-MODTCP Modbus TCP card allows the same access to all the drive parameters as the native serial Modbus (RS485).

EtherNet/IP

The SV2-CM-ENETIP Ethernet/IP card allows both Explicit and Implicit (I/O) Messaging. The SureServo2 Pro software allows you to easily generate (with pull-down menus) an EDS file for import into your PLC that contains exactly what you want in your Implicit Message.

Part Number	Price	Description	Drawing	Compatible Drives
SV2-CM-ENETIP	\$107.00	SureServo2 communication module, EtherNet/IP, 1 port, (1) Ethernet (RJ45) port.	PDF	All Core Core of
SV2-CM-MODTCP	\$97.00	SureServo2 communication module, Modbus TCP, 1 port, (1) Ethernet (RJ45) port.	<u>PDF</u>	- All SureServo2 drives



SV2-CM-ENETIP or SV2-CM-MODTCP

Accessories, continued

Motor Cables

Use the table to the right to select the correct SV2 motor cables (power, encoder, and brake) for your SureServo2 motor. Note that the largest frame brakemotors require a separate brake cable: 230V motors 5.5–15 kW and 460V motors 11kW–15kW. For smaller brakemotors, the brake wiring is incorporated into the motor power cable.

First find the motor part number in the left column, then reference the required cable part series under the Power, Encoder, and Brake columns. The first two "x" digits in the part numbers below are placeholders to represent length in meters while the 3rd "x" denotes flex (F) or non-flex (N) cabling. Brake vs non-brake cables are represented by a "B" or "N" at the end of the part number. For example, a 20m non-flex non-brake cable would end in 20NN, while a 3m flex-rated brake motor cable would end in 03FB. Note that SV2H series motors (5.5 kW and greater) use a separate cable to power the brake, so use an "N" cable for motor power. Also, if you use a flex-rated power cable (F series) you should use flex-rated encoder and brake power cables. The flex cables may not feel more flexible when compared sideby-side with the non-flex versions, but they are constructed with finer strands of wire and are designed to withstand millions of flex cycles (continuous flexing) without suffering from "cable corkscrew".

Specs and prices for the various cable options in each series can be found in the tables on the following pages.

Example:

You are purchasing an SV2L-201B brake motor and want 10m flex-rated cabling. What cables do you need? The abbreviated motor chart below shows that the SV2L-201B brake motor needs a PB18 series power cable and an E122 series encoder cable. Brake power is supplied through the power cable. The cable charts on subsequent pages enumerate all the various options and show that a 10m, flex, E122 series encoder cable is SV2C-E122-10FN and that a 10m, flex, PB series power cable is SV2C-PB18-10FB.

SureServo	2® Motor	Power Cable	Encoder Cable	Brake Cable			
230V	460V	Puwei Gable	Elicouel Gable	DIAKE CADIE			
SV2L-201N SV2L-202N SV2L-204N SV2L-207N	SV2L-404N SV2L-407N	SV2C-PA18-xxxN	SV2C-E122-xxxN				
SV2L-201B SV2L-202B SV2L-204B SV2L-207B	SV2L-404B SV2L-407B	SV2C-PB18-xxxB	3V2U-E122-XXXIN				
SV2L-210N	SV2L-410N SV2M-410N SV2L-415N SV2L-420N	SV2C-PC16-xxxN					
SV2L-210B	SV2L-410B SV2M-410B SV2L-415B SV2L-420B	SV2C-PC16-xxxB					
SV2M-210N SV2M-215N	_	SV2C-PC12-xxxN		n/a			
SV2M-210B SV2M-215B	_	SV2C-PC12-xxxB					
SV2M-220N SV2M-230N	<u>SV2H-430N</u>	SV2C-PD12-xxxN					
SV2M-220B SV2M-230B	SV2H-430B	SV2C-PD12-xxxB					
<u>SV2H-245N</u>	SV2H-445N SV2H-455N SV2H-475N	SV2C-PD08-xxxN	SV2C-E222-xxxN				
<u>SV2H-245B</u>	SV2H-445B SV2H-455B SV2H-475B	SV2C-PD08-xxxB					
SV2H-255N SV2H-275N SV2H-2B0N	-	SV2C-PF06-xxxN					
SV2H-255B SV2H-275B SV2H-2B0B	-	SV2C-PF06-xxxN		SV2C-B120-xxxB			
SV2H-2F0N	-	SV2C-PF04-xxxN		n/a			
SV2H-2F0B	-	SV2C-PF04-xxxN		SV2C-B120-xxxB			
-	<u>SV2H-4B0N</u> <u>SV2H-4F0N</u>	SV2C-PF08-xxxN		n/a			
-	<u>SV2H-4B0B</u> <u>SV2H-4F0B</u>	SV2C-PF08-xxxN		SV2C-B120-xxxB			





Encoder Cables



Separate Brake Cable (for large frame motors (see table))



Accessories, continued

SV2C-E122 Series Encoder Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-E122-03NN	\$60.00		3m		<u>PDF</u>		
SV2C-E122-05NN	\$82.00	N	5m		<u>PDF</u>		
SV2C-E122-10NN	\$130.00	N	10m		<u>PDF</u>	SV2C-E1-CON	SV2L-201x SV2L-202x SV2L-204x SV2L-207x
SV2C-E122-20NN	\$213.00		20m	22	<u>PDF</u>		
SV2C-E122-03FN	\$77.00		3m		<u>PDF</u>		
SV2C-E122-05FN	\$109.00	V	5m		<u>PDF</u>		SV2L-404x SV2L-407x
SV2C-E122-10FN	\$182.00	ī	10m		<u>PDF</u>		0V2E 407X
SV2C-E122-20FN	\$316.00		20m		<u>PDF</u>		

SV2C-E222 Series Encoder Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-E222-03NN	\$130.00		3m		PDF		SV2L-210x SV2L-410x
SV2C-E222-05NN	\$213.00	N	5m		<u>PDF</u>		SV2M-210x SV2M-410x
SV2C-E222-10NN	\$265.00	IN	10m	22	PDF	SV2C-E2-CON	SV2M-215x SV2L-415x SV2M-220x SV2L-420x
SV2C-E222-20NN	\$350.00		20m		PDF		SV2M-230x SV2H-430x
SV2C-E222-03FN	\$168.00		3m		PDF		SV2H-245x SV2H-445x
SV2C-E222-05FN	\$206.00	V	5m		PDF		SV2H-255x SV2H-455x SV2H-275X SV2H-475X
SV2C-E222-10FN	\$317.00	ľ	10m		PDF		SV2H-2B0x SV2H-4B0x
SV2C-E222-20FN	\$453.00		20m		PDF		SV2H-2F0x SV2H-4F0x

SV2C-PA18 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PA18-03NN	\$41.00		3m		PDF		
SV2C-PA18-05NN	\$54.00	N	5m		<u>PDF</u>		
SV2C-PA18-10NN	\$80.00	IN .	10m	40	<u>PDF</u>	CVOC DA CON	SV2L-201N SV2L-202N SV2L-204N SV2L-207N
SV2C-PA18-20NN	\$128.00		20m		PDF		
SV2C-PA18-03FN	\$57.00		3m	18	PDF	SV2C-PA-CON	
SV2C-PA18-05FN	\$77.00	V	5m		PDF		SV2L-404N SV2L-407N
SV2C-PA18-10FN	\$124.00	ř	10m	10m	<u>PDF</u>		3.2E-40114
SV2C-PA18-20FN	\$212.00		20m		<u>PDF</u>		

Accessories, continued

SV2C-PB18 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PB18-03NB	\$48.00		3m		PDF		
SV2C-PB18-05NB	\$63.00	N	5m		PDF		
SV2C-PB18-10NB	\$100.00	N	10m	18	PDF	SV2C-PB-CON	SV2L-201B SV2L-202B SV2L-204B SV2L-207B SV2L-404B SV2L-407B
SV2C-PB18-20NB	\$163.00		20m		<u>PDF</u>		
SV2C-PB18-03FB	\$72.00		3m	10	<u>PDF</u>		
SV2C-PB18-05FB	\$105.00	V	5m		<u>PDF</u>		
SV2C-PB18-10FB	\$176.00	Y	10m		<u>PDF</u>		
SV2C-PB18-20FB	\$313.00		20m		<u>PDF</u>		

SV2C-PC16 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PC16-03NN	\$140.00		3m		<u>PDF</u>		
SV2C-PC16-05NN	\$166.00	N	5m		PDF		
SV2C-PC16-10NN	\$219.00	IN	10m		<u>PDF</u>		SV2L-210N
SV2C-PC16-20NN	\$318.00		20m	16	PDF		SV2L-410N
SV2C-PC16-03FN	\$154.00		3m	10	PDF		SV2M-410N SV2L-415N SV2L-420N
SV2C-PC16-05FN	\$186.00	Υ	5m		PDF	SV2C-PC-CON	
SV2C-PC16-10FN	\$261.00	Ť	10m		PDF		
SV2C-PC16-20FN	\$401.00		20m		PDF		
SV2C-PC16-03NB	\$164.00		3m		PDF		
SV2C-PC16-05NB	\$198.00	N	5m		PDF		
SV2C-PC16-10NB	\$274.00	IN	10m		PDF		SV2L-210B
SV2C-PC16-20NB	\$415.00		20m	16	PDF		SV2L-410B
SV2C-PC16-03FB	\$184.00		3m	10	PDF		SV2M-410B SV2L-415B
SV2C-PC16-05FB	\$230.00	Y	5m		PDF		SV2L-420B
SV2C-PC16-10FB	\$335.00	Y	10m		<u>PDF</u>		
SV2C-PC16-20FB	\$537.00		20m		PDF		



Accessories, continued

SV2C-PC12 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PC12-03NN	\$192.00		3m		PDF		
SV2C-PC12-05NN	\$251.00	N.	5m		PDF		
SV2C-PC12-10NN	\$391.00	N	10m		PDF		
SV2C-PC12-20NN	\$659.00		20m	12	PDF		SV2M-210N
SV2C-PC12-03FN	\$210.00		3m	12	PDF		SV2M-215N
SV2C-PC12-05FN	\$279.00	Υ	5m		PDF	0)/00 P0 00N	
SV2C-PC12-10FN	\$443.00		10m		PDF		
SV2C-PC12-20FN	\$760.00		20m		PDF		
SV2C-PC12-03NB	\$213.00		3m		PDF	SV2C-PC-CON	
SV2C-PC12-05NB	\$280.00	N.	5m		PDF		
SV2C-PC12-10NB	\$442.00	N	10m		PDF		
SV2C-PC12-20NB	\$752.00		20m	12	PDF		SV2M-210B
SV2C-PC12-03FB	\$235.00		3m	12	PDF		SV2M-215B
SV2C-PC12-05FB	\$316.00	V	5m		<u>PDF</u>		
SV2C-PC12-10FB	\$513.00	Y	10m		<u>PDF</u>		
SV2C-PC12-20FB	\$892.00		20m		<u>PDF</u>		

SV2C-PD12 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PD12-03NN	\$203.00		3m		<u>PDF</u>		
SV2C-PD12-05NN	\$259.00	N	5m		<u>PDF</u>		
SV2C-PD12-10NN	\$397.00	IN	10m		PDF		
SV2C-PD12-20NN	\$662.00		20m	12	<u>PDF</u>		SV2M-220N SV2M-230N
SV2C-PD12-03FN	\$218.00		3m	12	PDF		SV2H-430N
SV2C-PD12-05FN	\$286.00	Υ	5m		PDF		
SV2C-PD12-10FN	\$449.00	ř	10m		PDF	01/00 PD 0011	
SV2C-PD12-20FN	\$761.00		20m		PDF		
SV2C-PD12-03NB	\$225.00		3m		PDF	SV2C-PD-CON	
SV2C-PD12-05NB	\$291.00	N	5m		PDF		
SV2C-PD12-10NB	\$449.00	IN IN	10m		PDF	1	
SV2C-PD12-20NB	\$754.00		20m	12	PDF		SV2M-220B
SV2C-PD12-03FB	\$246.00		3m] 12	PDF		SV2M-230B SV2H-430B
SV2C-PD12-05FB	\$328.00	Υ	5m		PDF		
SV2C-PD12-10FB	\$520.00	ľ	10m		PDF		
SV2C-PD12-20FB	\$892.00		20m		PDF		

Accessories, continued

SV2C-PD08 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PD08-03NN	\$328.00		3m		<u>PDF</u>		
SV2C-PD08-05NN	\$447.00	N	5m		PDF		
SV2C-PD08-10NN	\$750.00	IN IN	10m		PDF		SV2H-245N
SV2C-PD08-20NN	\$1,334.00		20m	8	<u>PDF</u>		SV2H-445N
SV2C-PD08-03FN	\$356.00		3m	0	<u>PDF</u>		SV2H-455N
SV2C-PD08-05FN	\$495.00	Y	5m		PDF	0,400 DD 000	SV2H-475N
SV2C-PD08-10FN	\$843.00	Ť	10m		PDF		
SV2C-PD08-20FN	\$1,527.00		20m		PDF		
SV2C-PD08-03NB	\$318.00		3m		PDF	SV2C-PD-CON	
SV2C-PD08-05NB	\$449.00	N.	5m		PDF		
SV2C-PD08-10NB	\$771.00	N	10m		PDF	1	SV2H-245B
SV2C-PD08-20NB	\$1,390.00		20m	8	PDF		SV2H-445B
SV2C-PD08-03FB	\$373.00		3m	0	<u>PDF</u>		SV2H-455B
SV2C-PD08-05FB	\$527.00	Y	5m		PDF	1	SV2H-475B
SV2C-PD08-10FB	\$908.00	Y	10m		PDF		
SV2C-PD08-20FB	\$1,643.00		20m		PDF		

SV2C-PF08 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PF08-03NN	\$315.00		3m		PDF		
SV2C-PF08-05NN	\$385.00	N	5m		PDF		
SV2C-PF08-10NN	\$563.00	N	10m		PDF		SV2H-4B0N
SV2C-PF08-20NN	\$975.00		20m	8	PDF	CVOC DE CON	SV2H-4B0B
SV2C-PF08-03FN	\$396.00		3m	0	PDF	SV2C-PF-CON	SV2H-4F0N
SV2C-PF08-05FN	\$522.00	V	5m		PDF		SV2H-4F0B
SV2C-PF08-10FN	\$825.00	ř	10m		PDF		
SV2C-PF08-20FN	\$1,495.00		20m		PDF		

SV2C-PF06 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PF06-03NN	\$437.00		3m		<u>PDF</u>		
SV2C-PF06-05NN	\$647.00	N	5m		<u>PDF</u>		
SV2C-PF06-10NN	\$1,129.00	N	10m		<u>PDF</u>		SV2H-255N SV2H-255B
SV2C-PF06-20NN	\$2,042.00		20m	6	PDF	SV2C-PF-CON	SV2H-275N
SV2C-PF06-03FN	\$509.00		3m	0	PDF	5V2U-PF-UUN	SV2H-275B
SV2C-PF06-05FN	\$716.00	V	5m		<u>PDF</u>		SV2H-2B0N SV2H-2B0B
SV2C-PF06-10FN	\$1,238.00	ř	10m		<u>PDF</u>		072112505
SV2C-PF06-20FN	\$2,250.00		20m		<u>PDF</u>		



Accessories, continued

SV2C-PF04 Series Power Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-PF04-03NN	\$509.00		3m		<u>PDF</u>		
SV2C-PF04-05NN	\$719.00	N	5m		PDF		
SV2C-PF04-10NN	\$1,211.00] IN	10m		PDF		
SV2C-PF04-20NN	\$2,203.00		20m	4	PDF	SV2C-PF-CON	SV2H-2F0N
SV2C-PF04-03FN	\$578.00		3m	4	<u>PDF</u>	5V2U-PF-CUN	SV2H-2F0B
SV2C-PF04-05FN	\$815.00		5m		<u>PDF</u>		
SV2C-PF04-10FN	\$1,419.00]	10m		PDF		
SV2C-PF04-20FN	\$2,592.00		20m		<u>PDF</u>		

SV2C-B120 Series Brake Cables

Part Number	Price	Flex Rated	Length	Gauge	Drawing	Connector	Compatible Motors
SV2C-B120-03NB	\$88.00		3m		<u>PDF</u>		
SV2C-B120-05NB	\$102.00	N	5m		<u>PDF</u>		
SV2C-B120-10NB	\$128.00	IN IN	10m		<u>PDF</u>		SV2H-255B SV2H-275B
SV2C-B120-20NB	\$172.00		20m	200	PDF	CV/00 D4 CON	SV2H-2B0B
SV2C-B120-03FB	\$95.00		3m	20	PDF	SV2C-B1-CON	SV2H-2F0B
SV2C-B120-05FB	\$112.00	V	5m		PDF		SV2H-4B0B SV2H-4F0B
SV2C-B120-10FB	\$149.00	Ť	10m		<u>PDF</u>		0 7 2 11 41 0 5
SV2C-B120-20FB	\$214.00		20m		PDF		

www.automationdirect.com Motion Control tMNC-317

Accessories, continued

External Encoder CN5 Cables

CN5 secondary encoder cables can be used to connect an external secondary encoder to a SureServo2 drive. The CN5 uses a wire not present in standard VGA cables - you must use one of these cables, standard HD15 VGA cables will not work.

Part Number	Price	Description	Length	Drawing	Compatible Drives
ZL-HD15M-CBL-2P	\$19.00	ZIPLink communication cable, 15-pin D-sub HD15 male to pigtail, shielded, twisted pair.	2m	<u>PDF</u>	All SV2 drives
ZL-HD15M-CBL-DB15F*	\$20.50	ZIPLink communication cable, 15-pin female D-sub to 15-pin D-sub HD15 male, shielded, twisted pair.	2m	<u>PDF</u>	All SV2 unves

^{*} ZL-RTB-DB15 is required to use the ZL-HD15M-CBL-DB15F cable

Pin Number	Color	Signal	Function
1	Black/White	Opt_/Z	/Z phase input
2	Blue/White	Opt_/B	/B phase input
3	Blue	Opt_B	B phase input
4	Green	Opt_A	A phase input
5	Green/White	Opt_/A	/A phase input
6	Yellow Yellow/Black	GND	Encoder grounding
7	Red/White	GND	Encoder grounding
8	Red	+5V	Encoder power
9	Black	Opt_Z	Z phase input
10	Orange	Reserved	Reserved
11	Orange/White	Reserved	Reserved
12	Brown	Reserved	Reserved
13	Brown/White	Reserved	Reserved
14	Purple	Reserved	Reserved
15	Purple/White	Reserved	Reserved



ZL-HD15M-CBL-2P



ZL-RTB-DB15



ZL-HD15M-CBL-DB15F

Battery Box

An optional external battery can be used to power SureServo2 encoders. The battery allows the use of Absolute Encoder Mode. This mode will keep track of the motor actual position (regardless of number of turns) even if control power is removed from the drive.

SV2-BBOX-1 attaches to the encoder cable. There is a small connector protruding from each encoder cable several inches from the drive-end connector. This connector plugs into the SV2-BBOX-1.

SV2-BBOX-CBL is not required for most applications. Use this cable to extend the length from the encoder cable's connector to the BBOX. This is used if you do not want the BBOX clamped onto the encoder cable right under the drive.

Part Number	Price	Description	Length	Drawing	Compatible Drives
SV2-BBOX-1	\$22.50	SureServo2 encoder single battery box, for use with all SureServo2 drives. (1) AA ER14505 lithium battery included.	-	<u>PDF</u>	All SV2 drives
SV2-BBOX-CBL	\$3.00	SureServo2 battery box cable, mating connectors, 7.8 in/200mm cable length. For use with SureServo2 encoder battery box.	200mm	<u>PDF</u>	All SV2 unves



SV2-BBOX-1
Motion Control

Accessories, continued

Serial Comms Connectors

Available serial comms connectors consist of an RS-485 splitter and an RS-485 terminating resistor. These connectors (and the drive's CN3) all use RJ45 connectors.

With these two connectors, you can easily create a multi-drop RS485 connection with minimal manual wiring. For multi-drop systems, use one SV2-CN3-CON-2 per drive. Connect each drive with a standard RJ45 (Ethernet patch) cable. On the last drive in the daisy-chain, plug in an SV2-CN3-TR2 to terminate the network. On the first drive, either strip one end of a patch cable to wire into your controller/PLC or plug into a ZL-RTB-RJ45 breakout board for easy wiring to your controller/PLC.

Part Number	Price	Description	Drawing	Compatible Drives
SV2-CN3-CON-2	\$11.50	SureServo2 splitter, (2) RS-485 (RJ45) to (1) RS-485 (RJ45)	<u>PDF</u>	All SureServo2
SV2-CN3-TR2	\$5.25	Terminating resistor, 120 ohm, RJ45 8P8C male.	<u>PDF</u>	Drives



SV2-CN3-CON-2



SV2-CN3-TR2

Toroid

A toroid (ferrite ring) is available for use with all SureServo2 drives to reduce radiated noise. See the user manual for application information for the SV2-TOR1.

Part Number	Price	Description	Drawing	Compatible Drives
SV2-TOR1	\$13.50	Toroid ring for EMI/RFI filtering (2 per pack)	<u>PDF</u>	All SureServo2 Drives



SV2-TOR1

Cable Connectors

Use the cable connectors below to build your own motor power, brake, or encoder cable

Part Number	Price	Description	Drawing	Compatible With
SV2C-PA-CON	\$11.50		PDF	750W or smaller SureServo2 motors w/o brake
SV2C-PB-CON	\$13.50		PDF	750W or smaller SureServo2 motors w/brake
SV2C-PC-CON	\$40.00	SureServo2 motor power connector	PDF	1 to 1.5 kW SureServo2 motors
SV2C-PD-CON	\$47.00		PDF	2 to 4.5 kW SureServo2 motors
SV2C-PF-CON	\$69.00		PDF	5.5 to 15 kW SureServo2 motors
SV2C-E1-CON	\$10.00	SureServo2 motor encoder connector	PDF	750W or smaller SureServo2 motors
SV2C-E2-CON	\$37.00	SureServoz motor encoder connector	PDF	1kW and larger SureServo2 motors
SV2C-E3-CON	\$10.00	CN2 encoder cable (connection to drive)	PDF	All SureServo2 drives
SV2C-B1-CON	\$32.00	SureServo2 motor brake connector	PDF	5.5 to 15 kW SureServo2 motors with brake





SV2C-PF-CON



SV2C-E1-CON

Motion Control †MNC-319

Accessories, continued

Replacement Connectors

The following replacement connectors can be purchased for use with SureServo2 drives. SV2-CN1-CON and SV2-CN10-STO are standalone connectors, while SV2-CON-KIT is a set of connectors.

Part Number	Price	Description	Drawing	Compatible With
SV2-CN1-CON	\$17.50	Optional 50-pin CN1 I/O connector (solder)	-	All SureServo2 drives
SV2-CON-KIT	\$21.50	SureServo2 replacement connector kit, contains: (1) SV2-CN10-STO connector (2) AC power connectors (1) Power resistor connector (1) Motor power connector (2) Wire insert tools	-	Up to 1.5 kW 230V SureServo2 drives (460V drives use integrated terminals)
SV2-CN10-STO	\$10.00	Replacement SureServo2 STO connector	PDF	All SureServo2 drives









SV2-CN10-STO

SV2-CN1-CON

Replacement Drive Fans

The following replacement fans can be purchased for use with SureServo2 drives. Each fan can be used to replace the fan on a specific 230 and 460 V drive. Please see the table below to find the correct part.

Part Number	Price	Description	Drawing
SV2-FAN-1	\$15.00	SureServo2 main cooling fan, replacement, 40 x 40 x 15mm, 12 VDC. For use with SureServo2 SV2A-2075 and SV2A-2150 drives. Electrical connector included.	PDF
SV2-FAN-2	\$14.00	SureServo2 main cooling fan, replacement, 50 x 50 x 20mm, 12 VDC. For use with SureServo2 SV2A-2200 and SV2A-2300 drives. Electrical connector included.	PDF
SV2-FAN-3	\$23.00	SureServo2 main cooling fan, replacement, 50 x 50 x 20mm, 12 VDC. For use with SureServo2 SV2A-4040, SV2A-4075 and SV2A-4150 drives. Electrical connector included.	<u>PDF</u>
SV2-FAN-4	\$24.00	SureServo2 main cooling fan, replacement, 60 x 60 x 25mm, 12 VDC. For use with SureServo2 SV2A-2550, SV2A-4300 and SV2A-4550 drives. Electrical connector included.	<u>PDF</u>
SV2-FAN-5	\$19.00	SureServo2 main cooling fan, replacement, 60 x 60 x 20mm, 12 VDC. For use with SureServo2 SV2A-2550, SV2A-4200 and SV2A-4550 drives. Electrical connector included.	<u>PDF</u>
SV2-FAN-6	\$27.00	SureServo2 main cooling fan, replacement, 70 x 70 x 25mm, 12 VDC. For use with SureServo2 SV2A-2750 and SV2A-4750 drives. Electrical connector included.	PDF
SV2-FAN-7	\$49.00	SureServo2 main cooling fan, replacement, 92 x 92 x 38mm, 24 VDC. For use with SureServo2 SV2A-2F00 drive. Electrical connector included.	<u>PDF</u>
SV2-FAN-8	\$38.00	SureServo2 main cooling fan, replacement, 92 x 92 x 38mm, 12 VDC. For use with SureServo2 SV2A-4F00 drive. Electrical connector included.	<u>PDF</u>



SV2-FAN-1



SV2-FAN-8



AC Servo Systems

3 Standard Drives ... 8 Standard Motors ... 100W to 3kW ... over 50 gearboxes (both inline and right angle) with four ratios





Drive features

- Main Power and Control Power Inputs
 - Main Power: 230 VAC 1-phase/3-phase (2kW and 3kW systems are 3-phase only)
 - Control Power: 230 VAC Single Phase; 50/60 Hz
- Fully digital with up to 450 Hz velocity loop response
- Easy setup and diagnostics with built-in keypad/display or the SureServo Pro PC-based software
- Five-in-one command options include:
 - ± 10V torque or velocity command
 - Pulse train or master encoder position command (accepts line driver or open collector) with electronic gearing
 - Built-in indexer for position control using 8 preset positions and/or position setpoint with serial Modbus
- Tuning aids include inertia estimation and easy tuning for up to 10 levels of response
- Optically isolated digital inputs (8) and outputs (5), analog outputs for monitor signals (2), and line driver output for encoder (with scalable resolution)

Motor features

- · Low inertia models:
- 100W, 200W, 400W, 750W and 1kW
- Speeds up to 5,000 rpm.
- · Medium inertia models:
- 1kW, 2kW and 3kW
- Speeds up to 3,000 rpm.
- Square flange mounting with metric dimensions:
- 40, 60, 80, 100, 130 and 180 mm flanges
- Permanent magnet 3-phase synchronous motor
- Keyless drive shafts support clamp-on style coupling
- Integrated encoder with 2,500 (x4) pulses/revolution plus marker pulse (once per revolution)
- Optional 24 VDC spring-set holding brakes
- Standard hook-up cables for motor power/brake and encoder
- Standard DIN-rail mounted ZIPLink break-out kit for the drive's CN1 connector (with screw terminal connections)

SureServo tuning technology

The SureServo drive closes the loop on

current, velocity, and position (depending on control mode selection). Proportional gain, integral gain, feed forward compensation, command low pass filter, and a notch filter for resonance suppression are available. There are three tuning modes:

- 1. "Manual Mode" for userdefined adjustments
- 2. "Easy Mode" for default settings over a wide range of programmed inertia with 10 response levels
- 3. "Auto Mode" for automatic adjustment using an estimated (or measured) value of inertia

SureServo built-in motion controller

While the SureServo drives can accept traditional commands from host controls, they can also provide their own internal motion control. For example, up to eight index moves can be pre-defined and stored in the drive and then selected and executed using up to three discrete inputs. The predefined index profiles can also be changed via serial communications. The motion can be incremental or absolute (homing routines are available in the drive) and acceleration can be linear or S-curve.

Multiple drives can be daisy-chained and addressed separately using the drive's serial port. This allows very simple yet powerful control of multi-axis processes that do not need precise path control but only precise starting and stopping points. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

SureServo Optional Holding Brake

Each SureServo motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

SureGear® Precision Gearboxes for Servo motors

Inertia balancing issue in your design?
The SureGear PGA

series easily mates to SureServo motors. Everything you need to mount your SureServo motor is included!

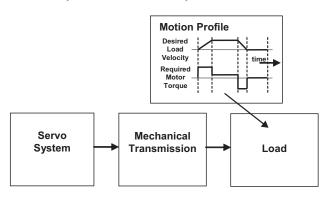
- Four gear ratios available (5, 10, 15, 25:1)
- Mounting hardware included for attaching to SureServo motors
- · Industry-standard mounting dimensions
- Thread-in mounting style
- Best-in-class backlash (5 arc-min)
- 5-year warranty

AC Servo Systems

How to select and apply SureServo systems

The primary purpose of the AC servo system is to precisely control the motion of the load. The most fundamental

considerations in selecting the servo system are "reflected" load inertia, servo system maximum speed requirement, servo system continuous torque requirement, and servo system peak torque requirement. In a retrofit application, select the largest torque SureServo system that most closely matches these



parameters for the system being replaced. In a new application, these

parameters should be determined through calculation and/or measurement.

AutomationDirect has teamed with Copperhill Technologies to provide free servo-sizing software. "VisualSizer-SureServo" software will assist in determining the correct motor and drive for your application by calculating the reflected load inertia and required speed and torque based on the load configuration. "VisualSizer-SureServo" software can be downloaded from www. sureservo.com/downloads.htm.

Information for selecting SureServo systems is also included in Appendix B of the SureServo User Manual, which can be downloaded from the AutomationDirect.com website.

1. "Reflected" load inertia

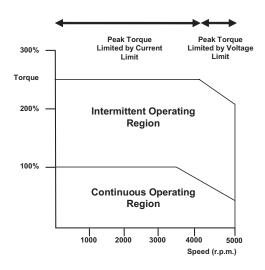
The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the motor driveshaft. The ratio of "reflected" load inertia to motor inertia needs to be carefully considered when selecting the servo system.

In general, applications that need high response or bandwidth will benefit from keeping the ratio of load inertia to motor

inertia as low as possible and ideally under 10:1. Systems with ratios as high as 200:1 can be implemented, but corresponding lower bandwidth or responsiveness must be accepted. The servo response including the attached load inertia is determined by the servo tuning. SureServo systems may be tuned manually, adaptively with measurement of the load inertia, or set with default tuning based on a programmed value of load inertia.

2. Torque and speed

With knowledge of the motion profile and any mechanical transmission between the motor and load, calculations can be made to determine the required servo motor continuous torque, peak torque, and maximum motor speed. The required amount of continuous torque must fall inside the continuous operating region of the system torque-speed curve (you can check the continuous torque at the average speed of the motion profile). The required amount of peak torque must also fall within the servo system's intermittent operating region of the system torque-speed curve (you need to check this value at the required maximum speed).



AC Servo Systems

Application tip - coupling considerations

The SureServo motors have keyless shafts that are designed for use with clamp-on or compression style couplings. Couplings using keys and/or set screws should NOT be used with SureServo motors as they are likely to come loose or damage the motor shaft. "Servo-grade" clamp-on or compression style couplings are usually the best choice when you consider the stiffness, torque rating, and inertia. Higher

stiffness

(lb-in/radian) is needed for better response but there is a trade-off between the stiffness and the added inertia of the coupling. Concerning the torque rating of the coupling, use a safety factor of 1.25 over the SureServo peak torque requirement of your application.

Coupling Suppliers: www.sureservo.com/couplingconsiderations.htm

Mechanical transmissions

Common mechanical transmissions include leadscrews, rack & pinion mechanisms, conveyors, gears, and timing belts. The use of leadscrew, rack & pinion, or conveyor are common

ways to translate the rotary motion of the servo motor into linear motion of the load. The use of a speed reducer such as a gearbox or timing belt can be very beneficial as follows:

1. Reduction of reflected load inertia

As a general rule, it is beneficial to keep the reflected load inertia as low as possible while using the full range of servo speed. SureServo systems can go up to 5,000 rpm for the low inertia motors and up to 3,000 rpm for the medium inertia motors.

Example: A gearbox reduces the required torque by a factor of the gear ratio, and reduces the reflected load inertia by a factor of the gear ratio squared. A 10:1 gearbox reduces output speed to 1/10, increases output torque 10 times, and decreases reflected inertia to 1/100.

However, when investigating the effect of different speed reduction ratios DO NOT forget to include the added inertia of couplings, gearbox, or timing belt pulleys. These added inertias can be significant, and can negate any inertia reduction due to the speed reduction.

2. Low speed and high torque applications

If the application requires low speed and high torque then it is common to introduce a speed reducer so that the

system can operate over more of the available speed range. This could also have the added benefit of reducing the servo motor torque requirement which could allow you to use a smaller and lower cost servo system. Additional benefits are also possible with reduction in reflected inertia, increased number of motor encoder counts at the load, and increased ability to reject load disturbances due to mechanical advantage of the speed reducer.

3. Space limitations and motor orientation

SureServo motors can be mounted in any orientation, but the shaft seal should not be immersed in oil (openframe gearbox, etc.). Reducers can possibly allow the use of a smaller motor or allow the motor to be repositioned. For example, some reducers would allow for in-line, right angle, or parallel mounting of the motor

For more information, refer to the website listed below.

www.sureservo.com/mechanical_trans.htm

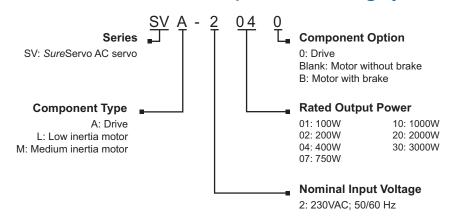
Ordering guide instructions

The following four pages are your ordering guide for the eight standard SureServo systems. Each of the eight standard systems has a torque-speed curve including the motor inertia for reference. This is the fundamental information that you need to select the servo drive and matching motor for your application.

Don't forget the cables and ZIPLink break-out board kit!

Included in the ordering guide are the available connection cables from the drive to motor in standard lengths from 10 to 60 feet. The break-out board kit includes a 0.5m (19 inch) cable for the CN1 I/O interface, and is listed for your convenience. We highly recommend all five items per system as a minimum. All cables are 100% factory tested to make your system installation as easy and quick as possible. See the Accessories section for regeneration resistors, AC line filters, fuses, contactors, and RF noise filters.

SureServo series drives and motors part numbering system



Here is what you will need to order a complete servo system:





NOTE: Unit can be programmed via keypad.

Optional programming software (free download) and optional programming cable available.



NOTE: If you need a gear box for your configuration, you can do it easily online: http://www.sureservo.com/gearbox/selector



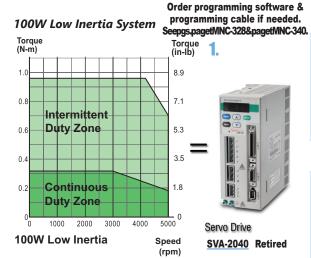
SureServo AC servo drive, motor, and cable combinations

	Inertia & Power		Drive and Motor			Power Cables (from Drive to Motor)			Encoder Feedback Cables			Miscellaneous		
Inertia	Power	Servo Drive	Servo Motor without brake (note)	Servo Motor with brake (note)	10 ft	20 ft	30 ft	60 ft	10 ft	20 ft	30 ft	60 ft	ZIPLink I/O Interface	RS-422/485 Serial Com- munication Cable
Low inertia	100W 200W 400W 750W	SVA- 2040	SVL-201 SVL-202 SVL-204 SVL-207	SVL-201B SVL-202B SVL-204B SVL-207B	SVC- PFL- 010	SVC- PFL- 020	SVC- PFL- 030	SVC- PFL-060	SVC- EFL- 010	SVC- EFL-020	SVC- EFL- 030	SVC- EFL- 060	ZL-RTB50 and	
	1000W 1000W	SVA- 2100	SVL-210 SVM-210	<u>SVL-210B</u> <u>SVM-210B</u>	SVC- PHM- 010	SVC- PHM- 020	SVC- PHM- 030	SVC- PHM- 060	SVC- EHH-	SVC-	SVC- EHH-	SVC- EHH-	ZL-SVC-CBL50 or ZL-SVC-CBL50-1 or	SVC-MDCOM- CBL
Medium inertia	2000W 3000W	SVA- 2300	SVM-220 SVM-230	<u>SVM-220B</u> <u>SVM-230B</u>	SVC- PHH- 010	SVC- PHH- 020	SVC- PHH- 030	SVC- PHH-060	010	EHH-020	030	060	ZL-SVC-CBL50-2	

Note: Each servo motor requires an encoder feedback cable and a power cable.

The motor power cable includes brake power wires for the optional motor brake.

For all systems:



Jm= Motor Inertia = 0.000027 lb-in-s2 (0.000003 kg - m2)

SureServo Motor



Motor Encoder Cable (1)



SVC-EFL-020 (20') \$141.00 \$165.00 **SVC-EFL-030** (30') SVC-EFL-060 (60') \$209.00

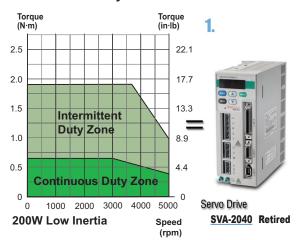
Motor Power Cable (1)



ZIPLink I/O Interface



200W Low Inertia System



Jm= Motor Inertia = 0.00016 lb-in-s2 (0.000018 kg - m2)

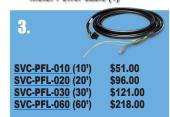
SureServo Motor



Motor Encoder Cable (1)



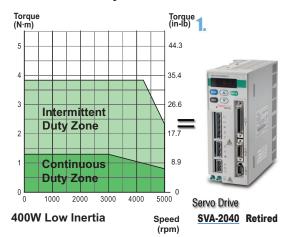
Motor Power Cable (1)



ZIPLink I/O Interface



400W Low Inertia System



Jm= Motor Inertia =0.0003 lb-in-s2 (0 .000034 kg - m2)

SureServo Motor



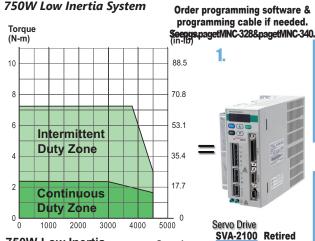


Motor Power Cable (1)





For all systems:



750W Low Inertia Speed (rpm) Jm= Motor Inertia = .00096 lb-in-s2 (0.000108 kg - m2)

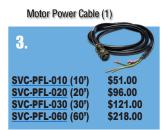


Motor Encoder Cable (1)

SVC-EFL-060 (60')

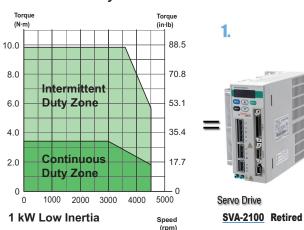


\$209.00





1 kW Low Inertia System



Jm= Motor Inertia = .0023 lb-in-s2 (0.00026 kg - m2)

SureServo Motor SVL-210 SVL-210B (w/brake) \$1,103.00



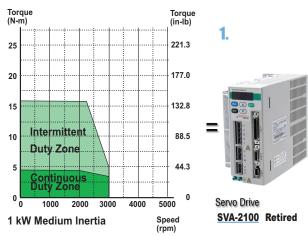






ZL-SVC-CBL50-1 (1m) \$51.00 ZL-SVC-CBL50-2 (2m) \$58.00

1 kW Medium Inertia System



Jm= Motor Inertia = .0053 lb-in-s2 (0.000598 kg - m2)



SVM-210B (w/brake) Retired

Motor Encoder Cable (1)



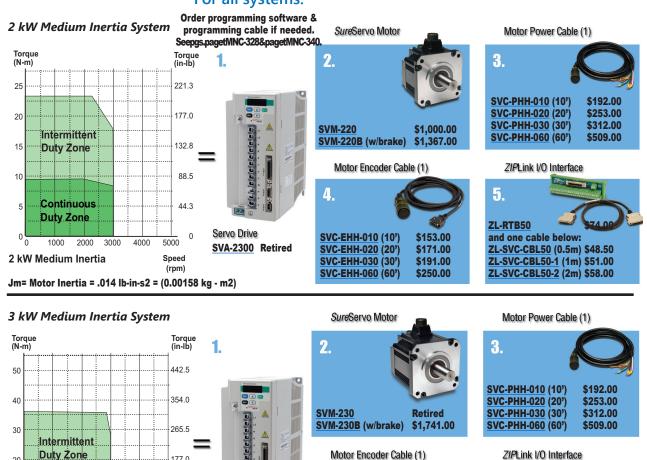
Motor Power Cable (1)



ZIPLink I/O Interface



For all systems:



SVC-EHH-010 (10')

SVC-EHH-020 (20')

SVC-EHH-030 (30')

SVC-EHH-060 (60')

\$153.00

\$171.00

\$191.00

\$250.00

Jm= Motor Inertia = 0.038 lb-in-s2 = (0.00433 kg - m2)

177.0

88.5

0

5000

Speed



20

10

Continuous

Duty Zone

3 kW Medium Inertia

NOTE: All Motor Power Cables include brake power wires for the optional motor brake.

Servo Drive

SVA-2300 Retired

SureServo Communications Cables for Muti-drop Networks

Product	Price	Description
SVC-MDCOM-CBL	\$43.00	RS-422/485 serial communication cable for use with multidrop networks; 3ft length; IEEE 1394 plug to unterminated wires; compatible with all SureServo systems. Facilitates connection between the SureServo drive serial port and host controllers.
<u>SVC-232RJ12-CBL-2</u> *	\$12.50	ZIPLink SureServo Drives cable with 6-pin RJ12 connector to a 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. For RS-232 connection to all SureServo amplifiers.
<u>SVC-485RJ12-CBL-2</u> *	\$15.00	ZIPLink SureServo amplifier communication cable, RJ12 male to 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. Cable used in conjunction with ZL-CDM-RJ12xxx distribution module can access a compatible RS-485 device network.
SVC-485HD15-CBL-2 *	\$13.50	ZIPLink SureServo Drives cable with a HD 15-pin male to a 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. For RS-485 connection to all SureServo amplifiers.

^{*} Refer to the ZIPLinks Wiring Solutions section for complete information regarding the ZIPLink cables.



5.

ZL-RTB50

and one cable below:

ZL-SVC-CBL50 (0.5m) \$48.50

ZL-SVC-CBL50-1 (1m) \$51.00

ZL-SVC-CBL50-2 (2m) \$58.00

AC Servo System Software

SureServo Pro configuration software

SureServo Pro is an optional free downloadable configuration software package for the SureServo drives. With SureServo Pro installed, the personal computer may be directly connected to the servo drive's serial port via the PC's RS-232 serial port*. A sixfoot configuration cable (<u>SVC-PCCFG-CBL</u>, \$37.50) is available to make the connection between the drive serial port and PC DB-9 serial port simple.

*Note: Use our <u>USB-RS232</u> converter cable in conjunction with the <u>SVC-PCCFG-CBL</u> cable on PCs having only USB ports.

Features

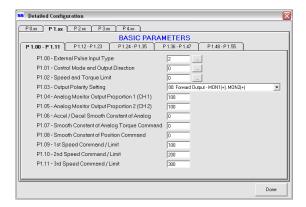
- Quick Start The basic setup when you have limited time and just want to get up and running ASAP.
- Maintenance keypad allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.
- Detailed The complete setup for all the drive parameters
- Tune and check the servo response live using the scope feature.
- Upload and download the drive setup. Save the drive setup as a file for future use.
- Edit the drive setup
- · View all drive faults
- Trend drive variables in real time

Parameter views

The SureServo Pro configuration tool logically organizes over 165 servo drive parameters into five tabbed groups. Each parameter has a factory default that usually allows the servo to run "out-of-the-box".

The parameters can be easily changed with available options or setting ranges displayed. Tuning modes and parameters can also be changed using SureServo Pro. After the parameters have been defined, the complete setup can be stored and archived. Drive configurations can be uploaded, edited, saved, and downloaded as often as necessary.

Parameter View Example Screen - Basic Parameters



SureServo Software and Configuration Cables



Product	Price	Description
<u>SV-PRO</u>	Free	SureServo Pro configuration software for use with all SureServo servo systems. FREE download from www.sureservo.com or www.automationdirect.com websites.
SVC-PCCFG-CBL	\$37.50	Six-foot RS-232 communications cable; connects servo drive serial port to PC DB-9 serial port. For PCs having only USB ports, use our USB-RS232 converter cable in conjunction with the SVC-PCCFG-CBL cable.
SVC-485CFG-CBL-2	\$18.50	ZIPLink SureServo amplifier configuration cable, 6-pin IEEE 1394 connector to RJ45 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. Use this cable in conjunction with our USB-485M serial adapter to connect any SureServo amplifier to a PC. Eliminates the need to reprogram networked servo drives from RS485 to RS232 when connecting to a PC.

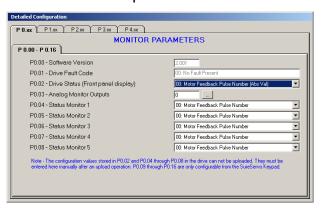
^{*} Refer to the ZIPLinks Wiring Solutions section for complete information regarding ZIPLink cable SVC-485CFG-CBL-2.



AC Servo System Software

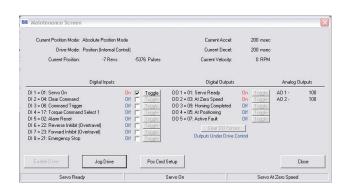
SureServo Pro configuration software -Parameter views (continued)

Parameter View Example Screen - Monitor Parameters

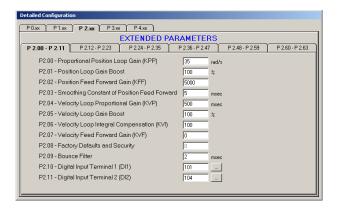


Maintenance screen

A maintenance keypad allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.

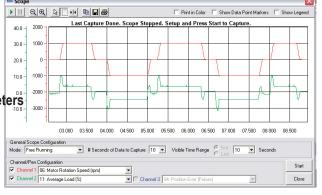


Parameter View Example Screen - Extended Parameters

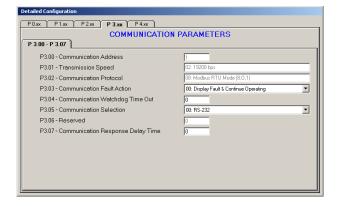


Scope

SureServo Pro includes a powerful scope function that allows the user to have as many as three channels of data displayed simultaneously. Each channel has a drop-down table to select the data to be displayed. The scope also has a trigger mode and timebase selection. This function is a valuable tool for tuning SureServo drives.



Parameter View Example Screen - Communication Parameters



AC Servo Drive Specifications

Servo drive overview

LED Display

The LED display has 5 full digits and is

used to indicate servo status and alarms

Power On LED

Main power is ON

Control Power Terminal

Single-phase power 230 VAC, 50/60 Hz is connected to L1 and L2

Main Power Terminal

Three-phase power 230 VAC, 50/60 Hz is connected to R, S and T

(Single-phase power 230 VAC 50/60 Hz may be connected to R and S for the low inertia systems)

Motor Output Terminal

The servo motor power cable is connected to U, V and W. Use our factory made and tested cables available in 10, 20, 30 or 60 foot lengths for easy connection.

Regenerative Resistor Terminal

- When the internal regenerative resistor is used, the P and D terminal are connected together while the P and C connection is left open.
- When an external regenerative resistor is used, it is connected across the P and C terminals while the P and D connection is left open. Use our factory approved resistors for "sure" results.

Keypad

Five Function keys:

MODE: Press to select or

change mode

NEXT: Press to shift left

UP: Press to increase values DOWN: Press to decrease values

ENTER: Press to enter value

I/O Interface

50-pin connector for interfacing the host controller (such as DirectLOGIC PLC) and other types of I/O signals.

Use our ZIPLink kit which provides DIN-rail mounted screw terminals for easy connection.

- · Command inputs:
 - Pulse and Direction Encoder Follower Analog Velocity/Torque
- (8) Digital Inputs
- (5) Digital Outputs
- (2) Analog Monitors
- Encoder Output (scalable) A+, A-, B+, B-, Z+, Z-

Encoder Interface

20-pin connector for interfacing the servo motor encoder. Use our factory-made and tested cable available in 10, 20, 30 or 60 foot lengths for easy connection.

Serial Communication Interface

6-pin RS-485/422/232 interface to personal computer with SureServo Pro set-up software or host controller with Modbus RTU/ASCII protocol. Use our factorymade cables for easy connection to the PC or the host controller.

SureServo systems run "out-of-the-box"... but may be reconfigured for many applications!

Ground Terminals

The SureServo drives are fully digital and include over 165 programmable parameters. For convenience, the parameters are grouped into five categories:

- 1. Monitor parameters
- 2. Basic parameters
- 3. Extended parameters
- 4. Communication parameters
- 5. Diagnostic parameters.

All parameters have commonly used default values which allow you to operate the SureServo system "out-of-the-box". However, the programmability and large variety of parameters make the SureServo systems suitable for a very broad range of applications, including almost all types of general purpose industrial machinery such as assembly, test, packaging, machine tool, and robotics.



AC Servo Drive Specifications

Servo drive specifications

General Drive Specifications							
Permissible Frequency	50/60 Hz ±5%						
Encoder Resolution / Feedback Resolution	2500 lines / 10000 ppr						
Control of Main Circuit	SVPWM (Space Vector Pulse Width Modulation) Control						
Tuning Modes	Easy / Auto / Manual						
Dynamic Brake	Built-in control						
Analog Monitor Outputs (2)	Monitor signal can be set by parameters (Output voltage range: ±8V; Resolution: 12.8 mV/ count)						
8 Programmable Digital Inputs	Servo enable, Alarm reset, Gain switching, Pulse counter clear, Fault stop, CW/CCW over-travel						
(45 selectable functions)	Internal parameter selection, Torque limit activation, Velocity limit activation, Control mode selection						
Scalable Encoder Output	Encoder signal output A, /A, B, /B, Z /Z, Line Driver						
5 Programmable Outputs (9 selectable indicators)	Servo ready, Servo On, Low velocity, Velocity reached, In Position, Torque limiting, Servo fault, Electromagnetic brake control, Home search completed						
Communication Interface	RS-232 / RS-485 / RS-422 / Modbus ASCII & RTU up to 115k Baud						
Protective Functions	Overcurrent, Overvoltage, Undervoltage, Overload, Excessive velocity/position error, Encoder error, Regeneration error, Communication error						
Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)						
Altitude	1000m [3281 ft] above sea level – maximum						
Operating Temperature	0 to 55 °C [32 to 131 °F] (If operating temperature is above 55°C, forced cooling is required). For long-term reliability, the ambient temperature of SureServo systems should be under 45°C (113°F).						
Storage Temperature	-20° to 65°C (-4° to 149°F)						
Humidity	0 to 90% (non-condensing)						
Vibration	9.81 m/s2 (1G) less than 20Hz, 5.88 m/s2 (0.6G) 20 to 50 Hz						
Protection	IP 20						
Agency Approvals	CE; UL Certified (U.S. and Canada)						



AC Servo Drive Specifications

Servo drive specifications (continued)

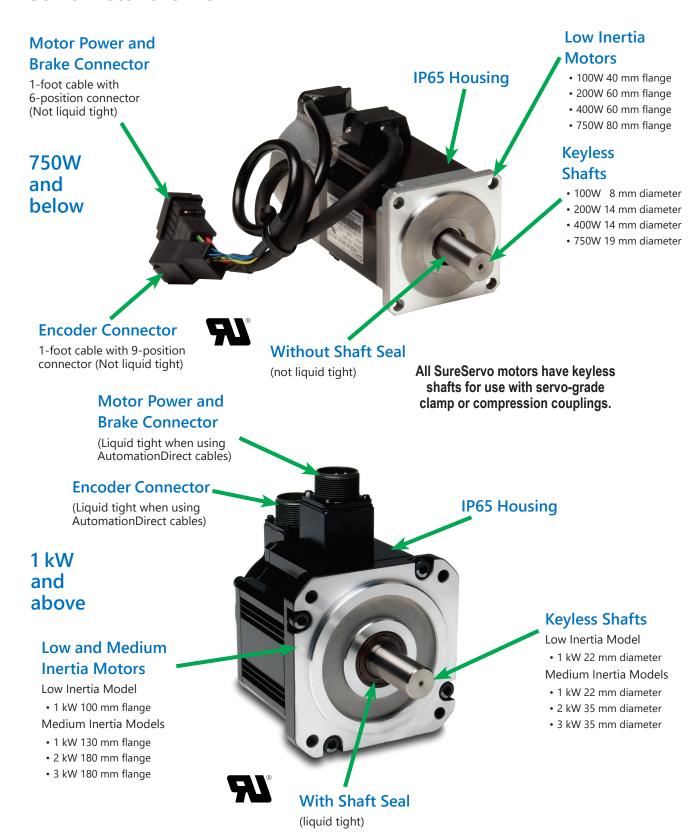
		Model a	nd Mod	le Spec	ific Dri	ve Spec	ificatio	ns			
		AC Servo Model		SVA-2040			SVA-2100		SVA-	<u> 2300</u>	
		Price		Retired			Retired		Ref	ired	
		Voltage Phase		Si	ingle-phase o	or Three-pha	se		Three-phase		
	Voltage a	nd Frequency Range		3-phase 1-phase	: 170~255 V/ :: 200~255 V/	AC @ 50/60 AC @ 50/60	Hz ±5%; Hz ±5%		170~255 VAC @ 50/6 ±5%		
	Main Circuit Input	3	3.4A @ 400V	V		8.0A @ 1kW	1		_		
	Current	Three Phase	2	2.6A @ 400V	V		6.2A @ 1kW	1	13.6A	@ 3kW	
	Main C	ircuit Inrush Current		44A 77A 87A					7A		
	Main C	ircuit Power Cycling			M	aximum 1 pc	wer cycle pe	er minute	'		
	Control Circuit	Current and Voltage			4	3 mA @ 200	~255 VAC,	1 phase			
	Control C	ircuit Inrush Current				32A	maximum				
		Cooling System	Natu	ıral Air Circul	lation		I	nternal Cool	ling Fan		
	Drive Heat Loss *	Motor driven *	SVL- 201(B)	SVL- 202(B)	SVL- 204(B)	SVL- 207(B)	SVL- 210(B)	SVM- 210(B)	SVM-220(B)	SVM-230(B)	
	Dirio nout 2000	Heat Loss	12W	15W	20W	35W	45W	50W	75W	80W	
		Weight		1.5 kg [3.3 lb	ol .		2kg [4lb]		3kg	[7lb]	
	Max. In	put Pulse Frequency				Line driver	<u> </u>	ops (Open			
lode		Max. 500 kpps (Line driver); Max. 200 kpps (Open collector) Pulse + Direction, A phase + B phase Quadrature, CCW pulse + CW pulse									
N 10		Pulse Type Command Source	External pulse train / Onboard indexer								
ontr		Low-pass and P-curve filter									
n C		Smoothing Strategy Electronic Gear	Electronic gear N/M multiple; N: 1~32767, M: 1~32767(1/50 <n m<200)<="" th=""></n>								
Position Control Mode	То	rque Limit Operation	Set by parameters or by analog input								
Po		rward Compensation	Set by parameters								
		Voltage Range	Bipolar ±10 VDC								
	Analog Input	Input Resistance	10 k								
	Command	Time Constant					2.2 µs				
ale		Resolution	(Va	aries with inp	ut voltage) 1	B bits @ 0V~1V; 13~10 bits @ 1V~2V; 10 bits @ 2V~10V					
Velocity Control Mode	S	Speed Control Range	1:5000								
ıtro/		Command Source	External analog signal / Onboard indexer								
CO		Smoothing Strategy					and S-curve				
city	То	rque Limit Operation			Set	t by paramet					
Velo		oonse Characteristic					num 450 Hz				
					0.01%	or less at 0	to 100% loa	d fluctuation	1		
	(ot a	Speed Accuracy rated rotation speed)			0.01	% or less at	±10% power	fluctuation			
	(at I	aleu Iolalion speeu)	0.01% or less at 0 to 50°C ambient temperature fluctuation								
		Voltage Range					ar ±10 VDC				
ale	Analog Input	Input Resistance				· · ·	10 kΩ				
Torque Control Mode	Command	Time Constant					2.2 µs				
tro/		Resolution					10 bits				
Con	Permissib	le Time for Overload	8 sec. under 200% rated output								
due		Command Source	External analog signal / Onboard indexer								
Tor		Smoothing Strategy					-pass filter				
	Sı	peed Limit Operation			Set	t by paramet	•	alog input			

^{*} Drive heat loss varies depending upon which motor is connected to the drive.



AC Servo Motor Specifications

Servo motor overview





AC Servo Motor Specifications

Maximum torque	<u>Sei vi</u>			M	Intor Sne	cification	10				
Second Name Second Sec	Inortia Pango			LV	iutui ope		10			Medium	
Peter				CV// 204	C1// 202	l e	CV// 207	CV// 240	CV/II/ 240	l e	CV/M 220
Second With brake Society So											
Petitod Peti		D									
No 100 200 440 750 1000 1000 200 30		•									
Note			1//		· ·						
Maximum torque	пасви оигриг рожег										
Name	Rated torque										
Machinan forque Machinan f											
Name Figure Fig	Maximum torque										
All transmission Tyme	Rated speed				1010		0011	01.10			0.0.0
A	•				5000		45	00		3000	
Type Park Figure Park	Rated current			1.1	1.7	3.3	5.0	6.8	5.6	13.1	17.4
Type Park Figure Park	Max. current										
An archies An											
No. 18	Drive input current									9.1	13.6
Max. thrust shall load	88 V-1 - 1 - 1 - 1			78.4	19	96	343			78	34
Voltage Vol	ıvıax. radıal shatt load		lb	18	4	4	77	11	10	1	76
Voltage Vo	May through about to a		N	39.2	68	3.6		98		39	92
Current ADC N=m ADC	Max. thrust shatt load		lb	9	1	5		22		8	8
No		Voltage	VDC				2	4			
Holding Torque N-m 0.32 1.27" 2.55 9.3 7.5 32.0 50.0	Duale	Current	ADC	0.21	0.	38	0.4	0.75	0.83	1.45	1.67
10-in 2.83 11.24 22.5 82.3 63.38 283.2 44.25	Бгаке	Holding Torque	N·m	0.32	1.	27	2.55	9.3	7.5	32.0	50.0
Static friction torque Normal N		Holaing Torque	lb∙in	2.83	11	.24	22.57	82.3	66.38	283.2	442.5
Motion in price Motion	Datas inautia w/a hyaka		kg·m2	0.03E-4	0.18E-4	0.34E-4	1.08E-4	2.6E-4	5.98E-4	15.8E-4	43.3E-4
Mechanical lime Mochanical lime Mochanic	ROLOT IIIETLIA W/O DTAKE	ake	lb·in·s2	0.27E-4	1.59E-4	3.0E-4	9.56E-4	23.0E-4	52.9E-4	139.8E-4	383.2E-4
Static friction torque N-m 0.6 0.9 0.7 0.6 1.7 1.4 1.6 0.9	Rotor inertia with brake		kg·m2	0.06E-4	0.28E-4	0.44E-4	1.32E-4	3.1E-4	8.8E-4	27.8E-4	56.3E-4
No. No.	Mechanical time		lb·in·s2	0.53E-4	2.48E-4	3.9E-4	11.7E-4	27.4E-4	77.9E-4	246.0E-4	498.3E-4
Normal	constant		ms	0.6	0.9	0.7	0.6	1.7	1.4	1.6	0.9
Voltage constant-KE	Static friction torque		N·m		-	·				-	I .
Armature resistance	Torque constant-KT									0.77	
Armature inductance mH 32 24 11 6.3 8.4 13.2 6.1 2.3	Voltage constant-KE										90.5E-3
1.6 3.2 3.2 4.8 4.1 6.7 10.1 14.2											
Brushless, AC, permanent magnet (Neodymium (Nd), Iron (Fe), Boron (B)) Insulation class Class F Insulation resistance >100 MΩ , 500 VDC Insulation strength 1500 VAC, 50 Hz, 60 seconds I										-	
Class F Simulation resistance Simulation resistance Simulation resistance Simulation resistance Simulation strength Simulation strength strength strength Simulation strength stren			ms	1.6					1		14.2
Storage temperature Storage humidity Storage					Brush	less, AC, perma		. ,), Iron (Fe), Bor	on (B)]	
Storage temperature Maritima Maritima											
Ambient temperature range											
To C (158°F) To C (158°F) To C (158°F) To C (230°F) To C											
Maximum operating temperature (measured case temperature)	, ,		nnoroturo)				•				
Comparation	, , ,		• /	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							
Column C	Storage temperature						-20 to 65°C	(-4 to 149°F)			
	Operating humidity					2		,)		
P65 motor body; IP40 shaft; IP20 connector IP65 (requires SureServo cables)	Storage humidity					2	20 to 90% RH (r	non-condensing)		
Meight without brake kg 0.5 0.9 1.3 2.5 4.7 4.8 12.0 17.0 Neight with brake lb 1.1 1.98 2.87 5.5 10.36 10.58 26.46 37.48 Neight with brake lb 1.54 3.09 3.97 7.5 13.89 16.53 41.89 52.9 Agency Approvals CE; UL recognized (U.S. and Canada)	Vibration / Shock						2.5G	5.0G			
Neight with brake Ib	Environmental rating			IP65 m	notor body; IP40	shaft; IP20 cor	nector	IF	P65 (requires S	ureServo cables	s)
Neight with brake	Weight without broke		kg	0.5	0.9	1.3	2.5	4.7	4.8	12.0	17.0
Neight with brake Ib 1.54 3.09 3.97 7.5 13.89 16.53 41.89 52.9 Agency Approvals CE; UL recognized (U.S. and Canada)	vvergini williout DFake		lb	1.1	1.98	2.87	5.5	10.36	10.58	26.46	37.48
1.54 3.09 3.97 7.5 13.89 16.53 41.89 52.9	Weight with hrake		kg	0.7	1.4	1.8	3.4	6.3	7.5	19.0	24.0
	vvoigni with blake		lb	1.54	3.09	3.97	7.5	13.89	16.53	41.89	52.9
	Agency Approvals					CE;	UL recognized	(U.S. and Cana	ada)		

NOTE: U.S. customary units are for reference only.

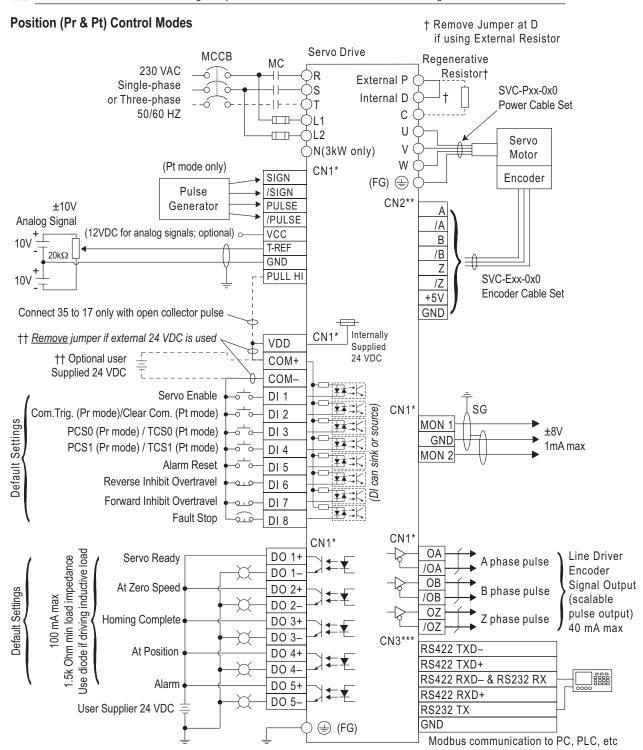


AC Servo System Wiring

Standard wiring examples



This wiring diagram shows basic wiring only, and additional wiring configurations are possible for some I/O. Refer to the "Installation and Wiring" chapter of the User Manual for more detailed wiring information.



- * Use connection kit part #s ZL-RTB50 & ZL-SVC-CBL-50(-x) for CN1 terminal connections.
- ** Use cable part # SVC-Exx-0x0 for CN2 terminal connections.
- *** Use cable part # SVC-MDCOM-CBL for CN3 terminal Modbus network connections.

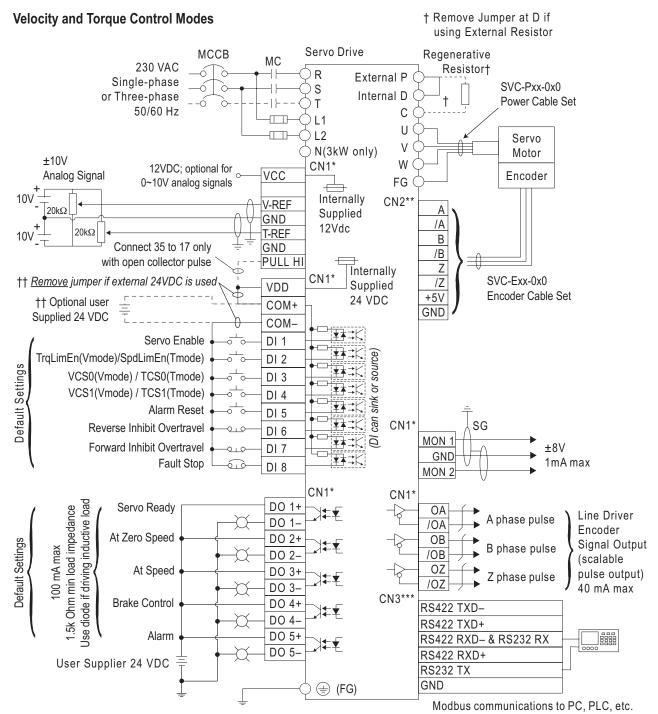


AC Servo System Wiring

Standard wiring examples (continued)



This wiring diagram shows basic wiring only, and additional wiring configurations are possible for some I/O. Refer to the "Installation and Wiring" chapter of the User Manual for more detailed wiring information.



^{*} Use connection kit part #s ZL-RTB50 & ZL-SVC-CBL-50(-x) for CN1 terminal connections.

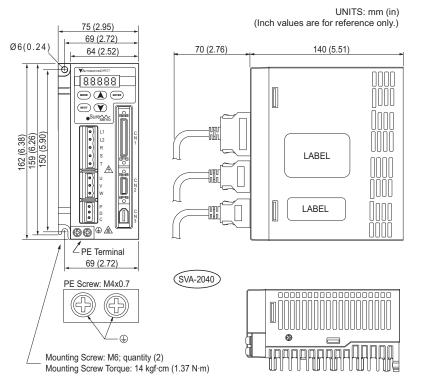
^{**} Use cable part # SVC-Exx-0x0 for CN2 terminal connections.

^{***} Use cable part # SVC-MDCOM-CBL for CN3 terminal Modbus network connections.

Servo drive dimensions *SVA-2040*

4

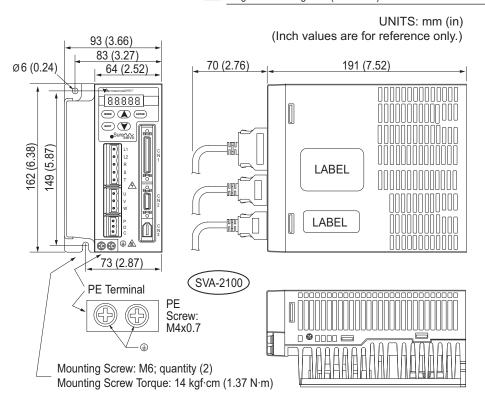
Recommended user supplied mounting screw is M6. Tighten to 14 kgf·cm (1.37 N·m).



SVA-2100



Recommended user supplied mounting screw is M6. Tighten to 14 kgf·cm (1.37 N·m).

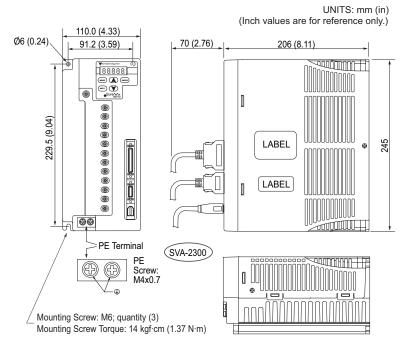


Servo drive dimensions (continued)

SVA-2300

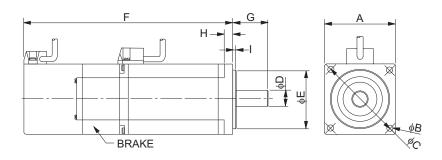


Recommended user supplied mounting screw is M6. Tighten to $14 \text{ kgf} \cdot \text{cm} (1.37 \text{ N·m})$.



Servo motor dimensions

Low inertia models SVL-201(B), SVL-202(B), SVL-SVL-204(B), SVL-207(B)



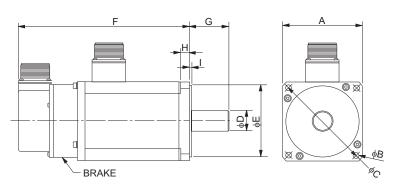
SureServ	vo® Motor Di	mensions –	100W-750W	Low Inertia			
Dimension	SVL-201(B)	SVL-202(B)	SVL-204(B)	SVL-207(B)			
Α	40 [1.575]	60	2.362]	80 [3.15]			
В	4.5 [0.1772]	5.5 [0.2165]	6.6 [0.2598]			
С	46 [1.811]	70	2.756]	90 [3.543]			
D	8 +0.0/-0.009 (8h6)	14 +0.0/-0	19 +0.0 -0.013 (19h6)				
Е	30 +0.0/-0.021 (30h7)	50 +0.0/-0	0.025 (50h7)	70 +0.0/-0.030 (70h7)			
F (w/o brake)	100.1 [3.941]	102.4 [4.032]	124.4 [4.898]	135 [5.315]			
F (with brake)	135.7 [5.343]	137 [5.394]	159 [6.26]	171.6 [6.756]			
G	25 [0.98]	30	30 [1.18]				
Н	5 [0.197]	6 [0	8 [0.315]				
1	2.5 [0.098]	3 [0.118]					
Cable length		300mm	(12 inches)				

UNITS: mm [in]. (Inches are for reference only; not included on diameter dimensions for accuracy.)



Servo motor dimensions (continued)

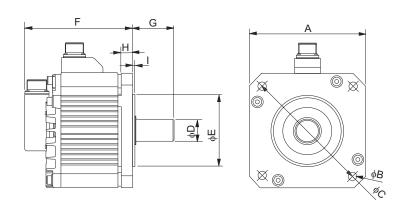
Low inertia models SVL-210(B)



SureServo® Motor Dimensions -1000W Low Inertia								
Dimension SVL-210(B)								
A	100 [3.937]							
В	9 [0.3543]							
С	115 +0.2/-0.2 [4.528]							
D	22 +0.0/-0.013 (22h6)							
E	95 +0.0/-0.035 (95h7)							
F (w/o brake)	158 [6.22]							
F (with brake)	190 [7.48]							
G	45 [1.77]							
Н	17 [0.669]							
1	7 [0.28]							

UNITS: mm [in] (Inches are for reference only; not included on diameter dimensions for accuracy.)

Medium inertia models SVM-210(B), SVM-220(B), SVM-230(B)



SureServ	SureServo® Motor Dimensions -1000W-3000W Medium Inertia									
Dimension	Dimension SVM-210(B) SVM-220(B) SVM-230(B)									
A	130 [5.118]	180 [7.087]								
В	9 [0.3543]	13.5 [0.5315]								
С	145 +0.2/-0.2 [5.709]	200 +0.2/-0.2 [7.874]								
D	22 +0.0/-0.013 (22h6)	35 +0.0/-0.016 (35h6)								
Ε	110 +0.0/-0.035 (110h7)	114.3 +0/-0.035 (114.3h7)								
F (w/o brake)	143 [5.63]	164 [6.457]	212 [8.35]							
F (with brake)	181 [7.126]	213 [8.386] 258 [10.16]								
G	55 [2.17]	75 [2.95]								
Н	15 [0.591]	20 [0.787]								
1		4 [0.157]								

UNITS: mm [in] (Inches are for reference only; not included on diameter dimensions for accuracy.)

Accessories

External Regeneration Resistors

Use external resistors to provide additional regenerative capacity and to dissipate heat away from the servo drive.

Part Number	Resistance	SureServo Drives	Price
GS-25P0-BR	40Ω	SVA-2040	\$49.50
GS-2010-BR-ENC	20Ω	SVA-2100, SVA-2300	\$344.00



Resistor GS-25PO-BR

AC Line Filters

Input EMI filters reduce electromagnetic interference or noise on the input side of the servo drive. They are required for CE compliance and recommended for installations prone to or sensitive to electromagnetic interference.

SureServo® Drives	AC Input Power	EMI Filter Rating	EMI Filter Part Number	Price
CVA 2040	Single-Phase	250V, 1-phase, 20A	20DRT1W3S	\$73.00
SVA-2040	Three-Phase	250V, 3-phase, 10A	<u>10TDT1W4C</u>	\$85.00
SVA-2100	Single-Phase	250V, 1-phase, 20A	20DRT1W3S	\$73.00
3VA-2100	Three-Phase	250V, 3-phase, 10A	<u>10TDT1W4C</u>	\$85.00
SVA-2300	Three-Phase	250V, 3-phase, 26A	26TDT1W4C	\$114.00



AC Line Filter 10TD1W4C



Note: These EMI Filters are electrically compatible with the SureServo drives. however, they are intended to be mounted next to the servo drive. Do not mount the filter under the drive. The drive mounting holes on these units are intended to be used only with AutomationDirect's line of VFDs.

Edison Fuses & Fuji Contactors

SureServo® Drives	Input Type	Input Voltage	Edison Fuse - Class CC	Price*	Contactor**	Price
SVA-2040	Main Input	0001/	HCTR4	\$173.00	SC-E02-xxx	varies
SVA-2100	Main Input Power	230V 3-Phase	HCTR7-5	\$193.00	SC-E03-xxx	varies
SVA-2300		J-1 Hase	HCTR15	\$163.00	SC-E04-xxx	varies
SVA-2040	1 OWCI	230V	HCTR4	\$173.00	SC-E02-xxx	varies
SVA-2100		1-phase	HCTR10	\$173.00	SC-E03-xxx	varies
SVA-2040 SVA-2100 SVA-2300	Control Input Power	230V 1-phase	HCTR2-5	\$178.00		



^{**} Note: For contactors, xxx = coil voltage (for example, SC-E02P-220VAC).

SureServo Connector Kit (replacement)

This kit contains replacement input, output, and brake connectors for SureServo drives.

Part Number	Description	SureServo Drives	Price
SVA-CON-1	SureServo connector kit, replacement, inclues (1) input power connector, (1) output power connector and (1) brake resistor connector.	SVA-2040 SVA-2100	\$22.00



Fuji Contactor SC-E02-xxx



Edison Fuse HCTRx



SVA-CON-1



SureGear® Servo Gearbox Overview

PGA In-line Series

The SureGear PGA series of high-precision servo gear reducers is an excellent choice for applications that require good accuracy and reliability at an exceptional value. This in-line planetary gear reducer has a thread-in mounting style, along with a level of

precision and torque capacity that is best in its class. Offered in a concentric shaft design with a maximum seven arc-min backlash rating, the SureGear PGA series is an accurate, high-performance, and cost effective solution for any OEM.

The machining quality of the SureGear PGA helical planetary gears provides a very quiet and more efficient reducer than other competitive products that are similarly priced. The SureGear PGA series easily mates to SureServo motors, and is the perfect solution for applications such as gantries, injection-molding machines,

pick-and-place automation, and linear slides.

PGB Right-angle Series

The SureGear PGB series of high-precision right-angle servo gear reducers is an excellent choice for applications that require a more compact footprint.

The PGB right-angle planetary gear reducers offer similar technical specifications to the PGA series in-line gear reducers, and provides the customer with an excellent solution when space and clearance requirements are limited.

Offered with a six arc-min backlash rating for 2-stage and nine arc-min backlash for 3-stage, the SureGear PGB series performs to OEMs' demanding expectations.

PGD Hub Style In-line Series

The SureGear PGD series sets a new standard in applications requiring extremely high-torque ratings and rigidity. The compact design and hubstyle output is ideal for equipment that requires high-speed, high-precision indexing movement. The remarkable torsion stiffness and the low backlash of the planetary gearing combine to provide outstanding positioning accuracy.

With a backlash rating less than 3 arc-minutes and exceptional torque handling capabilities, the PGD series offers a high performance robust planetary solution for OEM customers. The PGD reducer is often used for larger indexing applications and dial tables commonly found in packaging and filling equipment and assembly automation systems.

Features

- Thread-in mounting style
- · Best-in-class backlash
- Four gear ratios available (5:1, 10:1, 15:1, 25:1), Two additional for PGD models (35:1 and 50:1)
- Mounting hardware included for attaching to SureServo motors
- Helical-cut planetary gears for quiet operation and reduced vibration
- Right-angle reducer utilizes a spiral bevel gear; motor can be located at a 90° position from the reducer, providing a more compact footprint
- Uncaged needle roller bearings for high rigidity and torque
- Adapter bushing connection for simple and effective attachment to most servo motors
- High-viscosity, anti-separation grease does not migrate away from the gears; no leakage through the seal
- Maintenance free: No need to replace the grease for the life of the unit
- At nominal speed, service life is 20,000 hours
- · Can be positioned in any orientation
- IP55 environmental rating
- 5-year warranty



SureGear PGA Gearbox



SureGear PGB Gearbox



Hub Style PGD Gearbox



Applications

- Gantries
- Injection-molding machines
- Pick-and-place automation
- · Linear slides
- Packaging machines
- Conveyors



			Sure	ear®	Serv	o Gea	arbox	Selection			
SureServoMotor	Gear Ratio	SureGear Gearbox	Frame Size		Nominal Torque		Nominal Torque	Nominal Output	Max Output	Available Load Misma	
(SV and SV2)	паш	Gearbox	(mm)	N·m	<i>lb·in</i>	N·m	lb·in	Speed (rpm)	Speed (rpm)	kg·cm2	lb·in·s2
		PGD047-05A1	47							6.76	0.006
	5:1	PGA050-05A1	50			1.52	13.44	600	1200.00	6.94	0.006
	5.1	PGA070-05A1	70					000	1200.00	5.91	0.005
_		PGB070-05A1	70			1.49	13.16			1.59**	0.001**
		PGD047-10A1	47							28.15	0.025
	10:1	PGA050-10A1	50			3.04	26.89	300	600.00	28.35	0.025
	10.1	PGA070-10A1	70					300	000.00	25.75	0.023
SV2L-201(x)		PGB070-10A1	70	0.32	2.83	2.98	26.32			8.35**	0.007**
3 V 2L-20 I(X)		PGA050-15A1	50	0.32	2.03	4.32	38.21			62.66	0.055
	15:1	PGA070-15A1	70			4.32	30.21	200	400.00	58.16	0.051
		PGB070-15A1	70			4.22	37.36			54.11	0.048
		PGD047-25A1	47							174.69	0.155
	05.4	PGA050-25A1	50			7.20	63.68	400	040.00	174.69	0.155
	25:1	PGA070-25A1	70					120	240.00	162.81	0.144
		PGB070-25A1	70			7.04	62.26			151.56	0.134
	50:1	PGD064-50A1	64			14.40	127.35	60	120.00	661.25	0.585
		PGD064-05A2	64			2.04	07.00			28.75	0.025
	5:1	PGA070-05A2	70			3.04	27.08	600	1200.00	29.33	0.026
		PGB070-05A2	70			2.98	26.51			25.00	0.022
		PGD064-10A2	64			0.00	54.45			118.80	0.105
	10:1	PGA070-10A2	70			6.08	54.15	300	600.00	119.40	0.106
		PGB070-10A2	70			5.95	53.01			102.00	0.090
-		PGA070-15A2	70			8.64	76.95			268.88	0.238
01/01 000()	15:1	PGB070-15A2	70	0.04		0.45	75.04	200	400.00	264.83	0.234
SV2L-202(x)		PGB090-15A2	90	0.64	5.7	8.45	75.24			204.75	0.181
		PGD064-25A2	64			4.4.40	400.05			747.50	0.662
		PGA070-25A2	70			14.40	128.25			748.13	0.662
	25:1	PGB070-25A2	70					120	240.00	736.88	0.652
		PGB090-25A2	90			14.08	125.40			581.25	0.514
		PGD090-25A2	90			14.40	128.25			700.00	0.620
-		PGD090-50A2	90							2875.00	2.544
	50:1	PGD110-50A2	110			28.80	256.50	60	120.00	2125.00	1.881
		PGD064-05A2	64							53.75	0.048
	5:1	PGA070-05A2	70			6.03	53.20	600	1200.00	54.33	0.048
		PGB070-05A2	70			5.91	52.08	-		50.00	0.044
-		PGD064-10A2	64							218.80	0.194
	10:1	PGA070-10A2	70			12.07	106.40	300	600.00	219.40	0.194
		PGB070-10A2	70			11.81	104.16			202.00	0.179
-		PGA070-15A2	70			17.15	151.20			493.88	0.437
	15:1	PGB070-15A2	70					200	400.00	489.83	0.433
SV2L-204(x)		PGB090-15A2	90	1.27	11.2	16.76	147.84			429.75	0.380
		PGD064-25A2	64							1372.50	1.215
		PGA070-25A2	70			28.58	252.00			1373.13	1.215
	25:1	PGB070-25A2	70					120	240.00	1361.88	1.205
		PGB090-25A2	90			27.94	246.40	120	2.0.00	1206.25	1.068
		PGD090-25A2	90			28.58	252.00	-		1325.00	1.173
		PGD090-50A2	90			20.00	202.00			5375.00	4.757
-	50:1	PGD110-50A2	110			57.15	504.00	60	120.00	4625.00	4.093

^{*} Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)2 A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

** This gearbox is NOT a suitable choice at a 5:1 mismatch. If inertia balancing is a selection criteria for your end use, please use a mismatch of 8:1 to 10:1.



		Sure	Gear®	Serv	o Gea	rbox	Select	tion			
Sure Servo Motor	Gear	SureGear Gearbox	Frame Size		Vominal Torque		Nominal Torque	Nominal Output	Max Output		ad Inertia @ match *
ouro corvo motor	Ratio	Curoucur ucurbox	(mm)	N∙m	lb·in	N∙m	lb·in	Speed (rpm)	Speed (rpm)	kg·cm2	lb·in·s2
		PGA070-05A3	70			11.35	100.70			186.83	0.165
	5:1	PGB090-05A3	90			11.11	98.58	600	1200.00	143.75	0.127
		PGD090-05A3	90			11.35	100.70			174.25	0.154
		PGA090-10A3	90			22.71	201.40			726.00	0.643
	10:1	PGB090-10A3	90			22.23	197.16	300	600.00	586.00	0.519
C1/21 207/v1		PGD090-10A3	90	2.39	21.2	22.71	201.40			722.00	0.639
SV2L-207(x)	15:1	PGA090-15A3	90	2.39	21.2	32.27	286.20	200	400.00	1669.50	1.478
	15.1	PGB090-15A3	90			31.55	279.84	200	400.00	1622.25	1.436
		PGA090-25A3	90			53.78	477.00			4643.75	4.110
	25:1	PGB090-25A3	90			52.58	466.40	120	240.00	4518.75	3.999
		PGD110-25A3	110			53.78	477.00			4281.25	3.789
	50:1	PGD110-50A3	110			107.55	954.00	60	120.00	17875.00	15.819
		PGA090-05A4	90			15.11	133.69			321.25	0.284
	5:1	PGB090-05A4	90			14.79	130.88	600	1000.00	286.25	0.253
		PGD090-05A4	90			15.11	133.69			319.25	0.283
		PGA090-10A4	90			30.21	267.38			1296.00	1.147
	10:1	PGB090-10A4	90			29.57	261.75	300	500.00	1156.00	1.023
CV21 240(x)		PGD090-10A4	90	3.18	28.15	30.21	267.38			1292.00	1.143
SV2L-210(x)	15:1	PGA120-15A4	120	3.10	20.15	42.93	379.96	200	333.33	2884.50	2.553
	15.1	PGB120-15A4	120			41.98	371.52	200	333.33	2475.00	2.190
		PGD110-25A4	110			71.55	633.27			7843.75	6.942
	25:1	PGA120-25A4	120			7 1.55	033.27	120	200.00	8043.75	7.119
		PGB120-25A4	120			69.96	619.20			6918.75	6.123
	50:1	PGD110-50A4	110			143.10	1266.54	60	100.00	32125.00	28.431
		PGA090-05A5	90			22.66	200.54			1041.25	0.922
	5:1	PGD090-05A5	90			22.00	200.54	400.00	600.00	1039.25	0.920
		PGB120-05A5	120			22.18	196.31			925.75	0.819
		PGA090-10A5	90			45.20	401.07			4176.00	3.696
	10:1	PGD110-10A5	110			45.32	401.07	200.00	300.00	4172.00	3.692
CV2## 240(x)		PGB120-10A5	120	4 77	40.00	44.36	392.63			3759.00	3.327
SV2M-210(x)	45.4	PGA120-15A5	120	4.77	42.22	64.40	569.94	422.22	200.00	9364.50	8.288
	15:1	PGB120-15A5	120			62.96	557.28	133.33	200.00	8955.00	7.925
		PGD110-25A5	110			107.33	949.91		<u> </u>	25843.75	22.872
	25:1	PGA120-25A5	120			107.33	949.91	80.00	120.00	26043.75	23.049
		PGB120-25A5	120			104.94	928.80			24918.75	22.053
	35:1	PGD110-35A5	110			150.26	1329.87	57.14	85.71	50653.75	44.829

^{*} Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)2 A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.



		Sure	Gear®	Serv	o Gea	rbox	Select	tion			
Sure Servo Motor	Gear	SureGear Gearbox	Frame Size		Nominal Torque		Nominal Torque	Nominal Output	Max Output	Available Los 5:1 Mis	ad Inertia @ match *
ourc ocryo motor	Ratio	ourcucur ucurbox	(mm)	N·m	lb·in	N∙m	lb·in	Speed (rpm)	Speed (rpm)	kg·cm2	lb·in·s2
		PGA090-05A5	90			34.01	301.01			1390.00	1.230
	5:1	PGD090-05A5	90			34.01	301.01	400.00	600.00	1388.00	1.228
		PGB120-05A5	120			33.29	294.68			1274.50	1.128
		PGA090-10A5	90			60.00	602.03			5571.00	4.930
	10:1	PGD110-10A5	110			68.02	002.03	200.00	300.00	5567.00	4.927
SV2M-215(x)		PGB120-10A5	120	7.16	63.37	66.59	589.35			5154.00	4.561
3 V ZIVI-Z I 3(X)	15:1	PGA120-15A5	120	1.10	03.37	96.66	855.51	122.22	200.00	12503.25	11.065
	15.1	PGB120-15A5	120			94.51	836.50	133.33	200.00	12093.75	10.703
		PGD110-25A5	110			101.10	1405.00			34562.50	30.588
	25:1	PGA120-25A5	120			161.10	1425.86	80.00	120.00	34762.50	30.765
		PGB120-25A5	120			157.52	1394.17			33637.50	29.769
	35:1	PGD110-35A5	110			225.54	1996.20	57.14	85.71	67742.50	59.952
		PGD110-05A6	110			45.00	404.40			4280.00	3.788
	F 4	PGA120-05A6	120			45.36	401.49	400.00	000.00	4297.50	3.803
	5:1	PGB120-05A6	120			44.44	202.04	400.00	600.00	4212.00	3.728
		PGB155-05A6	155			44.41	393.04			3914.75	3.465
		PGD110-10A6	110			00.70	000.00			17240.00	15.257
01/01// 000/1	40.4	PGA120-10A6	120	0.55	04.50	90.73	802.98	000.00	200.00	17255.00	15.271
SV2M-220(x)	10:1	PGB120-10A6	120	9.55	84.52	00.00	700.00	200.00	300.00	16904.00	14.960
		PGB155-10A6	155			88.82	786.08			15884.00	14.057
	45.4	PGA155-15A6	155			128.93	1141.08	400.00	000.00	38745.00	34.289
	15:1	PGB155-15A6	155			126.06	1115.73	133.33	200.00	37597.50	33.274
	05.4	PGA155-25A6	155			214.88	1901.80	00.00	400.00	107750.00	95.359
	25:1	PGB155-25A6	155			210.10	1859.54	80.00	120.00	104593.75	92.565
		PGD110-05A6	110			00.00	707.00			6817.50	6.033
	F 4	PGA120-05A6	120			83.36	737.80	240.00	000.00	6835.00	6.049
	5:1	PGB120-05A6	120			04.04	700.04	340.00	600.00	6749.50	5.973
		PGB155-05A6	155			81.61	722.31			6452.25	5.710
		PGD110-10A6	110			400.70	4.475.00			27390.00	24.240
01/01// 000/1	40.4	PGA120-10A6	120	47.55	455.00	166.73	1475.68	470.00	200.00	27405.00	24.253
SV2M-230(x)	10:1	PGB120-10A6	120	17.55	155.33	400.00	4444.00	170.00	300.00	27054.00	23.943
		PGB155-10A6	155			163.22	1444.62			26034.00	23.040
	15.4	PGA155-15A6	155			236.93	2097.01	112.22	200.00	61582.50	54.501
	15:1	PGB155-15A6	155			231.66	2050.36	113.33	200.00	60435.00	53.485
	05.4	PGA155-25A6	155			394.88	3494.98	60.00	100.00	171187.50	151.501
	25:1	PGB155-25A6	155			386.10	3417.27	68.00	120.00	168031.25	148.708

^{*} Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)2 A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

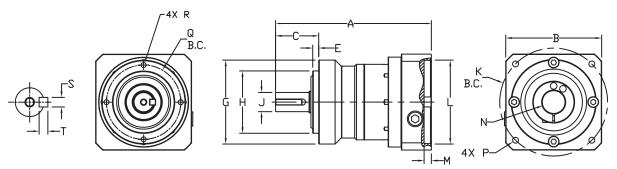


Pricing & Specifications – In-Line Shaft PGA Series

Pricin	<u>q & S</u>						<u>ie Shaf</u>											
		Sui	reGe	ar®	Precisi	on Serv	o Gearb	OXE	es -	- II	n-Line S	haft PG/	4 Ser	ies				
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [Ib·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor (SV & SV2)
PGA050-05A1	\$465.00		5:1	single	9 [80]	18 [159]	35 [310]	5			290 [65]	330 [74]	0.036	95		0.7 [1.5]		
PGA050-10A1	\$490.00	50	10:1	single	6 [53]	12 [106]	30 [266]	Ľ	4000	8000	360 [81]	450 [101]	0.030	-		0 [0]		
PGA050-15A1	\$672.00		15:1	double	6 [53]	12 [106]	30 [266]	7	4	8	410 [92]	540 [121]	0.035	90		0.8 [1.8]		1(B)
PGA050-25A1	\$672.00		25:1	double	9 [80]	18 [159]	35 [310]				490 [110]	640 [144]	0.034			[]		SV(2)L-201(B)
PGA070-05A1	\$465.00		5:1	single	27 [239]	50 [443]	100 [885]	-			510 [115]	390 [88]	0.077	95		1.5 [3.3]		V(2)I
PGA070-10A1	\$490.00		10:1	single	18 [159]	35 [310]	80 [708]	-			640 [144]	530 [119]	0.056					Ś
PGA070-15A1	\$672.00		15:1	double	18 [159]	35 [310]	80 [708]	-			740 [166]	630 [142]	0.055	90		1.7 [3.7]		
PGA070-25A1	\$672.00		25:1	double	27 [239]	50 [443]	100 [885]	-			870 [196]	790 [178]	0.053					
PGA070-05A2	\$508.00	70	5:1	single	27 [239]	50 [443]	100 [885]	-			510 [115]	390 [88]	0.160	95		1.5 [3.3]		2(B) 4(B)
PGA070-10A2	\$508.00		10:1	single	18 [159]	35 [310]	80 [708]	-			640 [144]	530 [119]	0.140					SV(2)L-202(B) SV(2)L-204(B)
PGA070-15A2	\$696.00		15:1	double	18 [159]	35 [310]	80 [708]	-			740 [166]	630 [142]	0.140	90		1.7 [3.7]		V(2)
PGA070-25A2	\$696.00		25:1	double	27 [239]	50 [443]	100 [885]	1			870 [196]	790 [178]	0.130			4 5 50 01		
PGA070-05A3	\$508.00		5:1	single	27 [239]	50 [443]	100 [885]	-			510 [115]	390 [88]	0.360	95		1.5 [3.3])7(B)
PGA090-10A3	\$601.00		10:1	single	50 [443]	80 [708]	200 [1770]	-			1200 [270]	1600 [360]	0.750			3.5 [7.7]		I2(
PGA090-15A3	\$794.00		15:1	double	50 [443]	80 [708]	200 [1770]	-			1400 [315]	1900 [427]	0.720	90		4.0 [8.8]		SV(2)L-207(B)
PGA090-25A3	\$794.00		25:1	double	75 [664]	125 [1106]	250 [2213]				1600 [360]	2200 [495]	0.710					
PGA090-05A4	\$600.00		5:1	single	75 [664]	125 [1106]	250 [2213]				960 [216]	1200 [270]	2.900					10(B)
PGA090-10A4	\$600.00	90	10:1	single	50 [443]	80 [708]	200 [1770]		3000	0009	1200 [270]	1600 [360]	2.800	95	°C [194 °F]	3.5 [7.7]	IP55	SV(2)L-210(B)
PGA090-05A5	\$600.00		5:1	single	75 [664]	125 [1106]	250 [2213]	5			960 [216]	1200 [270]	2.900	95	90			0(B)
PGA090-10A5	\$600.00		10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	2.800			3.5 [7.7]		SV(2)M-210(B)
PGA120-15A4	\$997.00		15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800			8.7 [19.2]		210(B)
PGA120-25A4	\$997.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				2700 [607]	3700 [832]	2.800	90				SV(2)L-210
PGA120-15A5	\$997.00	120	15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800			8.7 [19.2]		SV(2)M-210(B)
PGA120-25A5	\$997.00		25:1	double	180 [1593]		625 [5532]				2700 [607]	3700 [832]	2.800					SV(2)I
PGA120-05A6	\$795.00		5:1	single	180 [1593]		625 [5532]				1600 [360]	1900 [427]	11.000	95		7.8 [17.2]		<u>@@</u>
PGA120-10A6	\$795.00		10:1	single	120 [1062]		500 [4425]				2000 [450]	2500 [562]	11.000					SV(2)M-220(B) SV(2)M-230(B)
PGA155-10A6	\$982.00		10:1	single	240 [2124]		1000 [8851]		o	o	4700 [1057]	4100 [922]	11.000	95		16 [35.3])M-;)M-;
PGA155-15A6		155	15:1	double	240 [2124]		1000 [8851]	-	2000	4000	5400 [1214]	4900 [1102]	11.000	90		18 [40.0]		SV(2 SV(2
PGA155-25A6	\$1,336.00		25:1	double	360 [3186]	700 [6196]	1250 [11063]				6400 [1439]	6100 [1371]	11.000			- [,,0,,0]		



Dimensions – In-Line Shaft PGA Series



SureGear PGA Series In-Line Shaft Gearboxes Dimension Drawing

SureGear®	Pre	cision	Serv	o Ge	arbox	Dimen	sions	– In-Li	ine Sh	aft P0	GA Ser	ies (dimen	sions :	= mm	[in])
Part Number	A	В	С	E	G	Н	J	K	L	M	N	Р	Q	R	S	Т
PGA050-05A1	88.5	42.0	24.5	4.0	Ø50.0	Ø35.0	Ø12.0	Ø46.0	Ø30.0	5.0	Ø8.0	M4-	Ø44.0	M4-	4.0	4.0
PGA050-10A1	[3.48]	[1.65]	[0.96]	[0.16]	[Ø1.97]	[Ø1.38]	[Ø0.47]	[Ø1.81]	[Ø1.18]	[0.20]	[Ø0.31]	0.7x9	[Ø1.73]	0.7x8	[0.16]	[0.16]
PGA050-15A1	105.0	42.0	24.5	4.0	Ø50.0	Ø35.0	Ø12.0	Ø46.0	Ø30.0	5.0	Ø8.0	M4-	Ø44.0	M4-	4.0	4.0
PGA050-25A1	[4.13]	[1.65]	[0.96]	[0.16]	[Ø1.97]	[Ø1.38]	[Ø0.47]	[Ø1.81]	[Ø1.18]	[0.20]	[Ø0.31]	0.7x9	[Ø1.73]	0.7x8	[0.16]	[0.16]
PGA070-05A1	112.0	52.0	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø46.0	Ø30.0	5.0	Ø8.0	M4-	Ø62.0	M5-	5.0	5.0
PGA070-10A1	[4.41]	[2.05]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	[Ø1.81]	[Ø1.18]	[0.20]	[Ø0.31]	0.7x9	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGA070-05A2	115.0	65.0	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø70.0	Ø50.0	5.0	Ø14.0	M5-	Ø62.0	M5-	5.0	5.0
PGA070-10A2	[4.53]	[2.56]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	[Ø2.76]	[Ø1.97]	[0.20]	[Ø0.55]	0.8x11	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGA070-05A3	130.0	80.0	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø90.0	Ø70.0	6.0	Ø19.0	M6-	Ø62.0	M5-	5.0	5.0
	[5.12]	[3.15]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	[Ø3.54]	[Ø2.76]	[0.24]	[Ø0.75]	1.0x13	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGA070-15A1	131.0	52.0	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø46.0	Ø30.0	5.0	Ø8.0	M4-	Ø62.0	M5-	5.0	5.0
PGA070-25A1	[5.16]	[2.05]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	[Ø1.81]	[Ø1.18]	[0.20]	[Ø0.31]	0.7x9	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGA070-15A2	136.0	65.0	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø70.0	Ø50.0	5.0	Ø14.0	M5-	Ø62.0	M5-	5.0	5.0
PGA070-25A2	[5.35]	[2.56]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	[Ø2.76]	[Ø1.97]	[0.20]	[Ø0.55]	0.8x11	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGA090-10A3	153.0	80.0	46.0	7.0	Ø90.0	Ø68.0	Ø22.0	Ø90.0	Ø70.0	6.0	Ø19.0	M6-	Ø80.0	M6-	6.0	6.0
	[6.02]	[3.15]	[1.81]	[0.28]	[Ø3.54]	[Ø2.68]	[Ø0.87]	[Ø3.54]	[Ø2.76]	[0.24]	[Ø0.75]	1.0x13	[Ø3.15]	1.0x12	[0.24]	[0.24]
PGA090-05A4	170.0	100.0	46.0	7.0	Ø90.0	Ø68.0	Ø22.0	Ø115.0	Ø95.0	8.0	Ø22.0 *	M8-	Ø80.0	M6-	6.0	6.0
PGA090-10A4	[6.69]	[3.94]	[1.81]	[0.28]	[Ø3.54]	[Ø2.68]	[Ø0.87]	[Ø4.53]	[Ø3.74]	[0.31]	[Ø0.87]	1.25x17	[Ø3.15]	1.0x12	[0.24]	[0.24]
PGA090-05A5	165.0	130.0	46.0	7.0	Ø90.0	Ø68.0	Ø22.0	Ø145.0	Ø110.0	8.0	Ø22.0 *	M8-	Ø80.0	M6-	6.0	6.0
PGA090-10A5	[6.50]	[5.12]	[1.81]	[0.28]	[Ø3.54]	[Ø2.68]	[Ø0.87]	[Ø5.71]	[Ø4.33]	[0.31]	[Ø0.87]	1.25x17	[Ø3.15]	1.0x12	[0.24]	[0.24]
PGA090-15A3	175.0	80.0	46.0	7.0	Ø90.0	Ø68.0	Ø22.0	Ø90.0	Ø70.0	6.0	Ø19.0	M6-	Ø80.0	M6-	6.0	6.0
PGA090-25A3	[6.89]	[3.15]	[1.81]	[0.28]	[Ø3.54]	[Ø2.68]	[Ø0.87]	[Ø3.54]	[Ø2.76]	[0.24]	[Ø0.75]	1.0x13	[Ø3.15]	1.0x12	[0.24]	[0.24]
PGA120-05A6	225.0	180.0	70.0	9.0	Ø120.0	Ø90.0	Ø32.0	Ø200.0	Ø114.0	8.0	Ø35.0 *	M12-	Ø108.0	M8-	10.0	8.0
PGA120-10A6	[8.86]	[7.09]	[2.76]	[0.35]	[Ø4.72]	[Ø3.54]	[Ø1.26]	[Ø7.87]	[Ø4.49]	[0.31]	[Ø1.38]	1.75x25	[Ø4.25]	1.25x16	[0.39]	[0.31]
PGA120-15A4	231.5	100.0	70.0	9.0	Ø120.0	Ø90.0	Ø32.0	Ø115.0	Ø95.0	8.0	Ø22.0 *	M8-	Ø108.0	M8-	10.0	8.0
PGA120-25A4	[9.11]	[3.94]	[2.76]	[0.35]	[Ø4.72]	[Ø3.54]	[Ø1.26]	[Ø4.53]	[Ø3.74]	[0.31]	[Ø0.87]	1.25x17	[Ø4.25]	1.25x16	[0.39]	[0.31]
PGA120-15A5	231.5	130.0	70.0	9.0	Ø120.0	Ø90.0	Ø32.0	Ø145.0	Ø110.0	8.0	Ø22.0 *	M8-	Ø108.0	M8-	10.0	8.0
PGA120-25A5	[9.11]	[5.12]	[2.76]	[0.35]	[Ø4.72]	[Ø3.54]	[Ø1.26]	[Ø5.71]	[Ø4.33]	[0.31]	[Ø0.87]	1.25x17	[Ø4.25]	1.25x16	[0.39]	[0.31]
PGA155-10A6	264.0	180.0	97.0	12.0	Ø155.0	Ø120.0	Ø40.0	Ø200.0	Ø114.0	8.0	Ø35.0 *	M12-	Ø140.0	M10-	12.0	8.0
	[10.39]	[7.09]	[3.82]	[0.47]	[Ø6.10]	[Ø4.72]	[Ø1.57]	[Ø7.87]	[Ø4.49]	[0.31]	[Ø1.38]	1.75x25	[Ø5.51]	1.50x28	[0.47]	[0.31]
PGA155-15A6	298.5	180.0	97.0	12.0	Ø155.0	Ø120.0	Ø40.0	Ø200.0	Ø114.0	8.0	Ø35.0 *	M12-	Ø140.0	M10-	12.0	8.0
PGA155-25A6	[11.75]	[7.09]	[3.82]	[0.47]	[Ø6.10]	[Ø4.72]	[Ø1.57]	[Ø7.87]	[Ø4.49]	[0.31]	[Ø1.38]	1.75x25	[Ø5.51]	1.50x28	[0.47]	[0.31]

* Dimension with supplied bushing NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

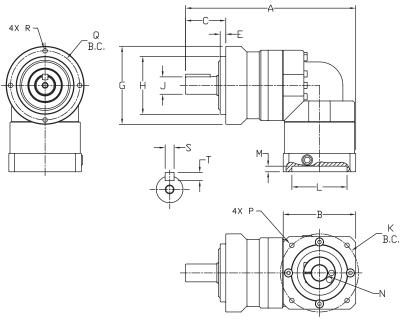
Pricing & Specifications – Right-Angle Shaft PGB Series

	Su	ire	Geai	r® Pi	ecisior	Servo	Gearbo	xes	_	Rig	ht-Angl	e Shaft I	PGB S	Ser	ies			
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor (SV & SV2)
PGB070-05A1	\$788.00		5:1	double	22 [195]	40 [354]	80 [708]	_			510 [115]	390 [88]	0.250	00		1.9		(B)
PGB070-10A1	\$788.00		10:1	double	16 [142]	32 [283]	65 [575]	6			640 [144]	530 [119]	0.230	93		[4.2]		-201
PGB070-15A1	\$997.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.073	88		1.7		SV(2)L-201(B)
PGB070-25A1	\$997.00		25:1	triple	24 [212]	45 [398]	90 [797]	9			870 [196]	790 [178]	0.071	00		[3.7]		
PGB070-05A2	\$788.00	70	5:1	double	22 [195]	40 [354]	80 [708]	6			510 [115]	390 [88]	0.320	93		1.9		SV(2)L-202(B) SV(2)L-204(B)
PGB070-10A2	\$788.00		10:1	double	16 [142]	32 [283]	65 [575]				640 [144]	530 [119]	0.300			[4.2]		
PGB070-15A2	\$997.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.118	88		1.7 [3.7]		SV(2)L-202(B)
PGB070-25A2	\$997.00		25:1	triple	24 [212]	45 [398]	90 [797]				870 [196]	790 [178]	0.115			[0.7]		
PGB090-15A2	\$1,217.00		15:1	triple	45 [398]	65 [575]	170 [1505]	9			1400 [314]	1900 [427]	0.410	88		4.3 [9.5]		SV(2)L-202(B) SV(2)L-204(B)
PGB090-25A2	\$1,217.00		25:1	triple	65 [575]	110 [974]	220 [1947]		3000	0009	1600 [360]	2200 [495]	0.400		1			
PGB090-05A3	\$932.00	90	5:1	double	65 [575]	90 [797]	220 [1947]	6	(K)	9	960 [216]	1200 [270]	2.130	93		4.9 [10.8]		SV(2)L-207(B)
PGB090-10A3	\$932.00		10:1	double	45 [398]	65 [575]	170 [1505]				1200 [270]	1600 [360]	2.020]			IL-20
PGB090-15A3 PGB090-25A3	\$1,217.00 \$1,217.00		15:1 25:1	triple	45 [398]	65 [575] 110 [974]	170 [1505] 220 [1947]	9			1400 [314]	1900 [427] 2200 [495]	0.600	88		4.3 [9.5]		3V(2)
PGB090-25A3	\$932.00		5:1	triple double	65 [575] 65 [575]	90 [797]	220 [1947]				1600 [360] 960 [216]	1200 [270]	4.260		90 °C		IP55	
PGB090-10A4	\$932.00		10:1	double	45 [398]	65 [575]	170 [1505]	6			1200 [270]	1600 [360]	4.150	93	[194 °F]	4.9 [10.8]	₫	10(B
PGB120-15A4	\$1,512.00		15:1	triple	110 [974]	200 [1770]	450 [3983]		-		2300 [517]	3000 [674]	4.700		,			SV(2)L-210(B)
PGB120-25A4	\$1,512.00		25:1	triple	150 [1328]	300 [2655]	550 [4868]	9			2700 [607]	3700 [832]	4.640	88		10 [22]		3V(2
PGB120-05A5	\$1,217.00		5:1	double	120 [1062]	240 [2124]	500 [4425]				1600 [360]	1900 [427]	6.610			10.2		
PGB120-10A5	\$1,217.00		10:1	double	110 [974]	200 [1770]	450 [3983]	6			2000 [450]	2500 [562]	6.050	93		[22.5]		(B)
PGB120-15A5	\$1,512.00		15:1	triple	110 [974]	200 [1770]	450 [3983]				2300 [517]	3000 [674]	4.700		-	10		SV(2) M-210(B)
PGB120-25A5	\$1,512.00	120	25:1	triple		300 [2655]	550 [4868]	9			2700 [607]	3700 [832]	4.640	88		[22]		≥
PGB120-05A6	\$1,217.00		5:1	double		240 [2124]	500 [4425]	6			1600 [360]	1900 [427]	13.690	93		10.2		SV(2)M-220(B) SV(2)M-230(B)
PGB120-10A6	\$1,217.00		10:1	double	110 [974]	200 [1770]	450 [3983]				2000 [450]	2500 [562]	13.120			[22.5]		SV(2)I SV(2)I
PGB155-15A6	\$1,770.00		15:1	triple	200 [1770]	400 [3540]	750 [6638]	9			5400 [1214]	4900 [1102]	15.070	88		20.4		SV(2)M-220(B)
PGB155-25A6	\$1,770.00	155	25:1	triple	300 [2655]	600 [5310]	1100 [9736]		2000	4000	6400 [1439]	6100 [1371]	14.820			[45.0]		SV(2)N
PGB155-05A6	\$1,401.00	 	5:1	double	200 [1770]	400 [3540]	1100 [9736]	6	20	40	3800 [854]	3000 [674]	21.280	93		19.8		SV(2)M-220(B) SV(2)M-230(B)
PGB155-10A6	\$1,401.00		10:1	double	200 [1770]	400 [3540]	750 [6638]	0			4700 [1057]	4100 [922]	19.030	33		[43.7]		SV(2)M SV(2)M

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Dimensions – Right-Angle Shaft PGB Series



SureGear PGB Series Right-Angle Shaft Gearboxes Dimension Drawing

SureG	ear®	Pre	cisio	n Se					ons – m [in		it-Ang	le Sha	aft PG	A Seri	es (
Part Number	Α	В	С	Ε	G	Н	J	K	L	M	N	Р	Q	R	S	Т
PGB070-05A1 PGB070-10A1	151.5	52.0 [2.05]						Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]		Ø8.0 [Ø0.31]	M4- 0.7x9				
PGB070-05A2 PGB070-10A2	[5.96]	65.0 [2.56]	36.0	5.0	Ø70.0	Ø52.0	Ø16.0	Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]		Ø14.0 [Ø0.55]	M5- 0.8x11	Ø62.0	M5-	5.0	5.0
PGB070-15A1 PGB070-25A1	158.0 [6.22]	52.0 [2.05]	[1.42]	[0.20]	[Ø2.76]	[Ø2.05]	[Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4- 0.7x9	[Ø2.44]	0.8x10	[0.20]	[0.20]
PGB070-15A2 PGB070-25A2	163.5 [6.44]	65.0						Ø70.0	Ø50.0		Ø14.0	M5-				
PGB090-15A2 PGB090-25A2	204.5 [8.05]	[2.56]						[Ø2.76]	[Ø1.97]		[Ø0.55]	0.8x11				
PGB090-05A3 PGB090-10A3	205.5 [8.09]	80.0	46.0	7.0	Ø90.0	Ø68.0	Ø22.0	Ø90.0	Ø70.0	6.0	Ø19.0	M6-	Ø80.0	M6-	6.0	6.0
PGB090-15A3 PGB090-25A3	210.5 [8.29]	[3.15]	[1.81]	[0.28]	[Ø3.54]	[Ø2.68]	[Ø0.87]	[Ø3.54]	[Ø2.76]	[0.24]	[Ø0.75]	1.0x13	[Ø3.15]	1.0x12	[0.24]	[0.24]
PGB090-05A4 PGB090-10A4	205.5 [8.09]	100.0						Ø115.0	Ø95.0							
PGB120-15A4 PGB120-25A4	272.0 [10.71]	[3.94]						[Ø4.53]	[Ø3.74]		Ø22.0 *	M8-				
PGB120-05A5 PGB120-10A5	266.0 [10.47]	130.0	70.0	9.0	Ø120.0	Ø90.0	Ø32.0	Ø145.0	Ø110.0		[Ø0.87]	1.25x17	Ø108.0	M8-	10.0	
PGB120-15A5 PGB120-25A5	272.0 [10.71]	[5.12]	[2.76]	[0.35]	[Ø4.72]	[Ø3.54]	[Ø1.26]	[Ø5.71]	[Ø4.33]	8.0 [0.31]			[Ø4.25]	1.25x16	[0.39]	8.0
PGB120-05A6 PGB120-10A6	268.5 [10.57]															[0.31]
PGB155-05A6 PGB155-10A6	341.0 [13.43]	180.0 [7.09]	97.0	12.0	Ø155.0	Ø120.0	Ø40.0	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.50]		Ø35.0 * [Ø1.38]	M12- 1.75x25	Ø140.0	M10-	12.0	
PGB155-15A6 PGB155-25A6	364.0 [14.33]		[3.82]	[0.47]	[Ø6.10]	[Ø4.72]	[Ø1.57]						[Ø5.51]	1.5x20	[0.47]	

* Dimension with supplied bushing NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

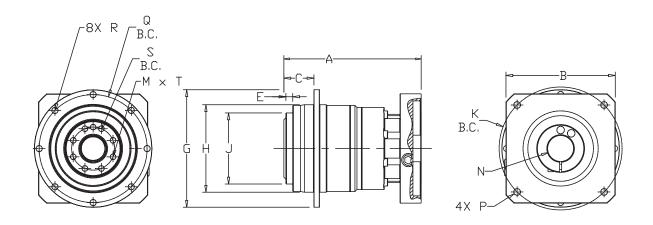
Pricing & Specifications – Hub Style In-Line PGD Series

	Sure	Gea	ar®	Prec	ision	Serv	o Ge	arb	oxes	s – H	lub S	tyle I	n-Lir	ie l	PGD	Serie	es	
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [Ib])	Allowable Thrust Load (N [Ib])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Ingress Protection (IP) Rating	Fits SureServo Servo Motor
PGD047-05A1	\$843.00		5:1	single	9 [80]	18 [159]	35 [310]	≤ 3			300 [67]	330 [74]	0.043	95		0.7		
PGD047-10A1	\$843.00	47	10:1	single	6 [53]	12 [106]	30 [266]	> 0	4000	8000	370 [83]	450 [101]	0.032	95		[1.5]		CV//2VL 204/DV
PGD047-25A1	\$1,056.00		25:1	double	9 [80]	18 [159]	35 [310]	≤ 5			510 [115]	550 [124]	0.034	90		0.8 [1.8]		SV(2)L-201(B)
PGD064-50A1	\$1,277.00		50:1	double	27 [239]	50 [443]	100 [885]				850 [191]	750 [169]	0.049	90		1.6 [3.5]		
PGD064-05A2	\$1,090.00	64	5:1	single	27 [239]	50 [443]	100 [885]				400 [90]	390 [88]	0.1	95		1.4 [3.1]		
PGD064-10A2	\$1,090.00	04	10:1	single	18 [159]	35 [310]	80 [708]				500 [112]	530 [119]	0.062	95		1.4 [3.1]		
PGD064-25A2	\$1,277.00		25:1	double	27 [239]	50 [443]	100 [885]				680 [153]	750 [169]	0.054	90		1.6 [3.5]		SV(2)L-202(B) SV(2)L-204(B)
PGD090-25A2	\$1,464.00		25:1	double	75 [664]	125 [1106]	250 [2213]				1300 [292]	1400 [315]	0.130	90		4 [8.8]		
PGD090-50A2	\$1,464.00		50:1	double	75 [664]	125 [1106]	250 [2213]				1700 [382]	1700 [382]	0.099	90		4 [8.8]		
PGD090-05A3	\$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]				780 [175]	680 [153]	0.580	95		3.6 [7.9]		SV(2)L-207(B)
PGD090-10A3	\$1,277.00	90	10:1	single	50 [443]	80 [708]	200 [1770]				980 [220]	920 [207]	0.330	95		3.6 [7.9]		0 v (2)L-201 (b)
PGD090-05A4	\$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]				780 [175]	680 [153]	0.580	95	90 °C [194	3.6 [7.9]	IP54	SV(2)L-210(B)
PGD090-10A4	\$1,277.00		10:1	single	50 [443]	80 [708]	200 [1770]				980 [220]	920 [207]	0.330	95	°F]	3.6 [7.9]	11 54	3V(2)L-210(b)
PGD090-05A5	\$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]	≤ 3	3000	6000	780 [175]	680 [153]	0.580	95		3.6 [7.9]		SV(2)M-210(B)
PGD110-50A2	\$1,868.00		50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		SV(2)L-202(B) SV(2)L-204(B)
PGD110-25A3	\$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		SV(2)L-207(B)
PGD110-50A3	\$1,868.00		50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		O V (2)2 201 (3)
PGD110-25A4	\$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		SV(2)L-210(B)
PGD110-50A4	\$1,868.00	110	50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		O V (2)2 2 10(D)
PGD110-10A5	\$1,588.00	110	10:1	single	120 [1062]	225 [1991]	500 [4425]				6200 [1394]	4200 [944]	1.100	95		7.8 [17.2]		
PGD110-25A5	\$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		SV(2)M-210(B)
PGD110-35A5	\$1,868.00		35:1	double	180 [1593]	330 [2921]	625 [5532]				9000 [2023]	6100 [1371]	0.700	90		8.6 [19]		
PGD110-05A6	\$1,588.00		5:1	single	180 [1593]	330 [2921]	625 [5532]				5000 [1124]	3400 [427]	2.300	95		7.8 [17.2]		SV(2)M-220(B)
PGD110-10A6	\$1,588.00		10:1	single	120 [1062]	225 [1991]	500 [4425]				6200 [1394]	4200 [944]	1.100	95		7.8 [17.2]		SV(2)M-230(B)

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Dimensions – Hub Style In-Line PGD Series



SureGear PGD Series Hub Style In-Line Gearboxes Dimension Drawing

	SureGear ®	Preci	sion	Servo	Gearb	ox Din				le Ir	-Line	PGD S	eries (dime	ensions	=
	Part Number	A*	B*	С	E	G	H	m [in]	K	M	N**	P	Q	R	S	Т
1	PGD047-05A1 PGD047-10A1	66.5	42.0	U	E	Ø72.0	Ø47.0	Ø28.0		4	Ø8.0		Ø67.0	3.4	Ø20.0	M3- 0.5x6.5
2	PGD047-25A1	[2.62]	[1.65]			[Ø2.83]	[Ø1.85]	[Ø1.102]	Ø46.0 [Ø1.811]		[Ø0.31]	M4- 0.7x9	[Ø2.6378]	[0.13]	[Ø0.7874]	U.5X6.5
2	PGD064-50A1	98.0 [3.86]	52.0 [2.05]	19.5 [0.7677]	3.0 [0.1181]						Ø8.0 [Ø0.31]					M5- 0.8x10
1	PGD064-05A2 PGD064-10A2	82.0 [3.228]		[0.7077]	[0.1101]	Ø86.0 [Ø3.385]	Ø64.0 [Ø2.52]	Ø40.0 [Ø1.575]		8	Ø14.0 [Ø0.55]		Ø79.0 [Ø3.11]	4.5 [0.18]	Ø31.5 [Ø1.24]	M5- 0.8x4
2	PGD064-25A2	103.0 [4.055]	65.0 [2.56]						Ø70.0 [Ø2.756]		Ø14.0 [Ø0.55]	M5- 0.8x11				M5- 0.8x10
2	PGD090-25A2 PGD090-50A2	122.0 [4.803]									Ø14.0 [Ø0.55]					
1	PGD090-05A3 PGD090-10A3	110.0 [4.33]	80.0 [3.15]					Ø63.0	Ø90.0 [Ø3.543]		Ø19.0 [Ø0.75]	M6- 1.0x13				
1	PGD090-05A4 PGD090-10A4	127.0	100.0 [3.94]	30.0 [1.1811]		Ø118.0 [Ø4.65]	Ø90.0 [Ø3.54]	[Ø2.48]	Ø115.0 ±0.2 [Ø4.528]	8	Ø28.0	M8-	Ø109.0 [Ø4.30]		Ø50.0 [Ø1.9685]	
1	PGD090-05A5	[5.0]	130.0 [5.12]						Ø145.0 ±0.2 [Ø5.709]		[Ø1.102]	1.25x17				
2	PGD110-50A2	159.5 [6.28]	65.0 [2.56]		6.0				Ø70.0 [Ø2.756]		Ø14.0 [Ø0.55]	M5- 0.8x11		5.5		M6-
2	PGD110-25A3 PGD110-50A3	169.5 [6.673]	80.0 [3.15]		[0.236]				Ø90.0 [Ø3.543]		Ø19.0 [Ø0.75]	M6- 1.0x13		[0.22]		1.0x12
2	PGD110-25A4 PGD110-50A4	186.5 [7.3425]	100.0 [3.94]	29.0		Ø145.0	Ø110.0	Ø80.0 [Ø3.15]	Ø115.0 ±0.2 [Ø4.528]	15	goo o		Ø135.0		Ø63.0	
1	PGD110-10A5	159.0 [6.26]	130.0	[1.142]		[Ø5.70]	[Ø4.33]	[دا.دها	Ø145.0 ±0.2	10	Ø28.0 [Ø1.102]	M8- 1.25x17	[Ø5.315]		[Ø2.48]	
2	PGD110-25A5 PGD110-35A5	186.5 [7.3425]	[5.12]						±0.2 [Ø5.709]							
1	PGD110-05A6 PGD110-10A6	180.0 [7.087]	180.0 [7.087]						Ø200.0 ±0.2 [Ø7.874]		Ø38.0 [Ø1.45]	M12- 1.75x25				

NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

^{*} Length will vary depending on motor ** Bushing will be inserted to adapt to motor shaft



SureGear® Servo Gearbox Replacement Parts



SureGear® Precision Servo Gearboxes – Replacement Parts		
Part Number	Price	Description
PG050-KEY	\$4.50	Output Shaft Key, replacement, 4 x 4 x 14 mm, for SureGear PGA050 series gearboxes.
PG070-KEY	\$4.50	Output Shaft Key, replacement, 5 x 5 x 22 mm, for SureGear PGA070 and PGB070 series gearboxes.
PG090-KEY	\$4.50	Output Shaft Key, replacement, 6 x 6 x 28 mm, for SureGear PGA090 and PGB090 series gearboxes.
PG120-KEY	\$4.50	Output Shaft Key, replacement, 10 x 8 x 45 mm, for SureGear PGA120 and PGB120 series gearboxes.
PG155-KEY	\$4.50	Output Shaft Key, replacement, 12 x 8 x 65 mm, for SureGear PGA155 and PGB155 series gearboxes.
PGA4-A5-BUSH	\$22.50	Input Shaft Bushing, replacement, 28 x 22 x 30.5 mm, for all SureGear gearboxes using SV(2)L-210(B) and SV(2)M-210(B) SureServo motors.
PGA6-BUSH	\$22.50	Input Shaft Bushing, replacement, 38 x 35 x 36 mm, for all SureGear gearboxes using SV(2)M-220(B) and SV(2)M-230(B) SureServo motors.

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