

AC Servo Systems

Drive features

- Power:
 - » 100W-2kW = single-phase 110VAC or single/three-phase 220VAC
 - » 3kW-15kW = three-phase 220VAC
- Fully digital with up to 3.1 kHz velocity loop response
- Easy setup and diagnostics with built-in keypad/display or the SureServo2 Pro 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 electronic gearing
 - » Powerful built-in motion controller for position control using 99 preset positions and/or position setpoint with serial Modbus (native), Modbus TCP (option card), or Ethernet/IP (option card) with ability to talk Implicit and Explicit. SureServo2 Pro software can generate a custom EDS file to transfer exactly what you need between the PLC and drive.
 - » 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)

» Flectronic cam



- » 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 and 1kW
 - » 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:
 - » 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 5.5kW and larger)
- 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 20-pin spring clamp terminal block 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-topoint 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 inbetween 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 can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

SureGear 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

Motion Profile

Desired Load
Velocity
Required Motor
Torque

Mechanical
Transmission
Load

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.sureservo.com/downloads.htm.

1. "Reflected" load inertia

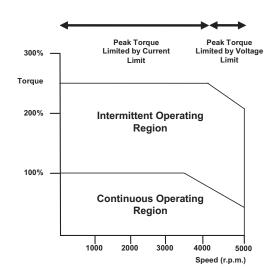
The inertia of everything attached to the servo motor driveshaft needs to be considered and the total "reflected" inertia needs to be determined. This means that all elements of any mechanical transmission and load inertia need to be translated into an equivalent inertia as if attached directly to the 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 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 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> <u>Precision Gearboxes</u>

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.

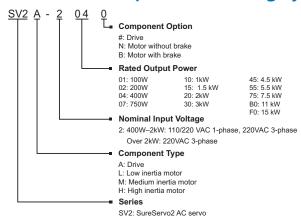
A wide variety of optional accessories are also available, such as Ethernet cards, RS485 splitters/terminators, toroids, etc.

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



AC Servo System Configuration

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



Torque to SureServo2 System Quick Reference

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	SV2A-2040
0.64	2.24	SV2L-202N or SV2L-202B	SV2A-2040
1.27	3.96	SV2L-204N or SV2L-204B	SV2A-2040
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	SV2M-210N or SV2M-210B	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	SV2A-2F00



AC Servo System Configuration Servo 2

SureServo2 AC servo drive, motor, and cable combinations

Туре	System Torque Chart		SureServo2 Drive	SureServo2 Motor	Power Cable	Encoder Cable	I/O Cable and Breakout
tem	1.12 (350%)			SV2L-201N	SV2C-PA18-xxNN	SV2C-E122-xxNN	
nertia Sysi	Torque (N-m)	Intermittent Region	SV2A-2040	3V2L-2011N	SV2C-PA18-xxFN	SV2C-E122-xxFN	
100W Low Inertia System	0.32 (100%) 0.16 (50%)	Continuous Region	3V2A-2040	SV2L-201B	SV2C-PB18-xxNB	SV2C-E122-xxNN	
10	(50%)	3,000 4,800 6,000 Speed (r/min)		3422 2018	SV2C-PB18-xxFB	SV2C-E122-xxFN	SV2-CN1-CBL50xxx + SV2-CN1-RTB50
шә,	2.24 (350%) 1.90 (297%)			SV2L-202N	SV2C-PA18-xxNN	SV2C-E122-xxNN	+
nertia Syst	(297%) (W-W)	Intermittent Region	SV2A-2040	SVEL ESEIV	SV2C-PA18-xxFN	SV2C-E122-xxFN	2 ·
200W Low Inertia System	0.64 (100%) 0.32	Continuous Region	3V2A-2040	SV2L-202B	SV2C-PB18-xxNB	SV2C-E122-xxNN	OR
20	(50%)	3,000 4,300 6,000 Speed (r/min)		3422 2025	SV2C-PB18-xxFB	SV2C-E122-xxFN	SV2-CN1-LTB20
ш	3.96 (312%) 3.48 (274%)			CVOL 20 AN	SV2C-PA18-xxNN	SV2C-E122-xxNN	
400W Low Inertia System	Torque (N·m)	Intermittent Region	CV24 2040	SV2L-204N	SV2C-PA18-xxFN	SV2C-E122-xxFN	
OW Low In	1.27 (100%) 0.65 (50%)	Continuous Region	SV2A-2040	SV2L-204B	SV2C-PB18-xxNB	SV2C-E122-xxNN	
40	(3078)	3,000 4,400 6,000 Speed (r/min)		3122 2040	SV2C-PB18-xxFB	SV2C-E122-xxFN	



Туре		System Torque Chart	SureServo2 Drive	SureServo2 Motor	Power Cable	Encoder Cable	I/O Cable and Breakout
,em	7.86 (329%) 6.63			SV2L-207N	SV2C-PA18-xxNN	SV2C-E122-xxNN	
nertia Syst	(277%) Lorque (N·m)	Intermittent Region	SV2A-2075	3422 23714	SV2C-PA18-xxFN	SV2C-E122-xxFN	
750W Low Inertia System	2.39 (100%)	Continuous Region	3VZA-2013	SV2L-207B	SV2C-PB18-xxNB	SV2C-E122-xxNN	
75	1.195 (50%)			3421-2076	SV2C-PB18-xxFB	SV2C-E122-xxFN	SV2-CN1-CBL50xxx + SV2-CN1-RTB50
tem	8.12 (255%)			SV2L-210N -	SV2C-PC16-xxNN	SV2C-E222-xxNN	+
1.0k W Low Inertia System	3.18 (10%)	Intermittent Region	SV2A-2150		SV2C-PC16-xxFN	SV2C-E222-xxFN	
K W Low	3.18 (100%)	Continuous Region	3VZA-2130		SV2C-PC16-xxNB	SV2C-E222-xxNN	OR
1.0	1.91 (60%)	3,000 3,300 5,000 Speed (r/min)		3722 2103	SV2C-PC16-xxFB	SV2C-E222-xxFN	SV2-CN1-LTB20
ystem	14,32 (300%)			SV2M-210N	SV2C-PC12-xxNN	SV2C-E222-xxNN	
ı Inertia S	Torque (N·m)	Intermittent Region	SV2A-2150	342141-21014	SV2C-PC12-xxFN	SV2C-E222-xxFN	
1.0k W Medium Inertia System	4.77 – (100%)	4.77 (100%) Continuous Region	3VZA-Z13U	SV2M-210B	SV2C-PC12-xxNB	SV2C-E222-xxNN	
1.0k	3.20 L (67%)	2,000 3,000 Speed (r/min)		342141-2100	SV2C-PC12-xxFB	SV2C-E222-xxFN	



Туре			System Torque Chart	SureServo2 Drive	SureServo2 Motor	Power Cable	Encoder Cable	I/O Cable and Breakout	
ystem		14.88 (208%)			SV2M-215N	SV2C-PC12-xxNN	SV2C-E222-xxNN		
n Inertia S	Torque (N·m)	7.16	Intermittent Region		372171-21317	SV2C-PC12-xxFN	SV2C-E222-xxFN		
1.5 kW Medium Inertia System	Torq	7.16 (100%)	Continuous Region	SV2A-2150	SV2M-215B	SV2C-PC12-xxNB	SV2C-E222-xxNN		
1.5 KI		4.60 (67%)	2,000 2,400 3,000 Speed (r/min)		345141-5139	SV2C-PC12-xxFB	SV2C-E222-xxFN	SV2-CN1-CBL50xxx + SV2-CN1-RTB50	
ystem		24.54 (257%)			SV2M-220N	SV2C-PD12-xxNN	SV2C-E222-xxNN	+	
Inertia S	Torque (N·m)		Intermittent Region	SV2A-2200		SV2C-PD12-xxFN	SV2C-E222-xxFN	D	
2.0 kW Medium Inertia System	Torq	9.55 (100%)	Continuous Region		SV2M-220B	SV2C-PD12-xxNB	SV2C-E222-xxNN		
2.0 KV		6.40 (67%)	2,000 2,200 3,000 Speed (r/min)			SV2C-PD12-xxFB	SV2C-E222-xxFN	OR SV2-CN1-LTB20	
stem		48.29 (275%)				SV2C-PD12-xxNN	SV2C-E222-xxNN		
Inertia Sy	Torque (N·m)		Intermittent Region		SV2M-230N	SV2C-PD12-xxFN	SV2C-E222-xxFN		
3.0 kW Medium Inertia System	Torqu	17.55 (100%) 10.00 (57%) 9.55 (54%)	Continuous Region	SV21-2300	SV2M-230B	SV2C-PD12-xxNB	SV2C-E222-xxNN		
3.0 K		[1,700 1,800 3,000 Speed (r/min)		342141-2308	SV2C-PD12-xxFB	SV2C-E222-xxFN		



Туре		System Torque Chart	SureServo2 Drive	SureServo2 Motor	Power Cable	Encoder Cable	I/O Cable and Breakout	
stem	71.62 (250%)			SV2H-245N	SV2C-PD08-xxNN	SV2C-E222-xxNN		
nertia Sys	Torque (N·m)	Intermittent Region	SV2A-2550	3V2H-243IN	SV2C-PD08-xxFN	SV2C-E222-xxFN		
4.5 kW High Inertia System	28.65 (100%) 14.33 (50%)	65	3V2A-2330	SV2H-245B	SV2C-PD08-xxNB	SV2C-E222-xxNN		
4.5	(3070)	1,500 3,000 Speed (r/min)		34211-2430	SV2C-PD08-xxFB	SV2C-E222-xxFN	SV2-CN1-CBL50xxx + SV2-CN1-RTB50	
tem	87.53 (250%)			SV2H-255N	SV2C-PF06-xxNN	SV2C-E222-xxNN	+	
nertia Sys	Torque (N·m)	Intermittent Region	CV24 2550		SV2C-PF06-xxFN	SV2C-E222-xxFN	2	
5.5 kW High Inertia System	35.01 (100%) 17.51 (50%)	Continuous Region	SV2A-2550		SV2C-PF06-xxNN and SV2C-B120-xxxx	SV2C-E222-xxNN	(
5.51	(30%)	1,500 3,000 Speed (r/min)		SV2H-255B	SV2C-PF06-xxFN and SV2C-B120-xxxx	SV2C-E222-xxFN	OR SV2-CN1-LTB20	
tem	119.36 - (250%)			SV2H-275N	SV2C-PF06-xxNN	SV2C-E222-xxNN		
nertia Sys	Torque (N·m)			3V2H-2/3IN	SV2C-PF06-xxFN	SV2C-E222-xxFN		
7.5 kW High Inertia System	47.74 (100%) 23.87 (50%)		SV2A-2750		SV2C-PF06-xxNN and SV2C-B120-xxxx	SV2C-E222-xxNN		
7.5 4	(50%)	Continuous Region 1,500 3,000 Speed (r/min)		SV2H-275B	SV2C-PF06-xxFN and SV2C-B120-xxxx	SV2C-E222-xxFN		
			,					



Туре		Ş	System Torque Chart	SureServo2 Drive	SureServo2 Motor	Power Cable	Encoder Cable	I/O Cable and Breakout
stem	1 (25	75.0			SV2H-2B0N	SV2C-PF06-xxNN	SV2C-E222-xxNN	
Inertia Sy.	Forque (N·m)		Intermittent Region	CV24 2F00	37211 25014	SV2C-PF06-xxFN	SV2C-E222-xxFN	SV2-CN1-CBL50xxx + SV2-CN1-RTB50
11.0 kW High Inertia System		70.0 (100%) 52.5 (75%) Continuous Region	SV2A-2F00	SV2H-2B0B -	SV2C-PF06-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN	+	
11.0			1,500 2,000 Speed (r/min)		3V2H-2DUD	SV2C-PF06-xxFN and SV2C-B120-xxFB	SV2C-E222-xxFN	1 ·
	1				I			D. C.
stem	2 (23	24.0 35%)			CV2LL 2FON	SV2C-PF04-xxNN	SV2C-E222-xxNN	OR
nertia Sy:	Forque (N·m)		Intermittent Region		SV2H-2F0N	SV2C-PF04-xxFN	SV2C-E222-xxFN	SV2-CN1-LTB20
15.0 kW High Inertia System	(10	9 55.4 (100%) 71.6 (75%) Continuous Region	SV2A-2F00		SV2C-PF04-xxNN and SV2C-B120-xxNB	SV2C-E222-xxNN		
15.0	1,500 2,000 Speed (r/min)				SV2H-2F0B SV2C-PF04-xxFB and SV2C-B120-xxFB		SV2C-E222-xxFN	
11.						and	SV2C-E222-xxFN	

AC Servo Drive Specifications

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

Single-phase power 120/220 VAC, 50/60 Hz is connected to L1 and L2

Main Power Terminal

- 100W-2kW systems: Single-phase 120/220 VAC or three-phase 220VAC
- 3kW-15kW systems: Three-phase 220VAC

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.
- 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

Ground Terminals

Safe Torque Off (STO) Connector Port

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.

High Density DB15 Connector

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

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 parameters
 - 5) 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.

TÜVRheinlan

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

AC Servo Drive Specifications servo 2

Servo drive specifications

			SureServo2	Drive Specif	ications					
	Model	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00	
	Price	\$339.00	\$424.00	\$456.00	\$573.00	\$675.00	\$937.00	\$1,129.00	\$1,523.00	
	Drawing	PDF	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	<u>PDF</u>	
	Power Rating	400W	750W	1.5 kW	2kW	3kW	5.5 kW	7.5 kW	15kW	
	Input Voltage	Sin	gle-phase 100–120 gle-phase 200–230 ree-phase 200–230) VAC, -15% to +1	0%	Thi	ree-phase 200–230) VAC, -15% to +1()%	
	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 (16777216 p/rev)								
	Main Circuit Control	SVPWM control								
	Control Mode				Manua	I / Auto				
	Regenerative Resistor		Built-in (ex	xternal options also	available)			External (optional)		
	Pulse Type			Pulse + D	irection, CCW puls	e + CW pulse, AB (Quadrature			
Position Control Mode	Max. Input Pulse Frequency				Pulse + Direc CCW pulse + CV AB Quadrature: sin Open collect	V pulse: 4 Mpps; gle-phase 4 Mpps;				
n Co	Command Source	External pulse / Internal registers								
sitio	Smoothing Method	Low-pass and P-curve filter								
Po	Torque Limit	it Parameter settings								
	Feed Forward Compensation				Paramete	r settings				
			Contin	ued on next page						



re____ AC Servo Drive Specifications servo2

Servo drive specifications (continued)

			SureS	ervo2 Drive	Specificatio	ns Continue	d					
	Мо	del	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00		
		Voltage Range				±10\	/DC					
	Analog Command	Resolution		15-bit								
	Input	Input Impedance		1ΜΩ								
de		Time Constant				25	μs					
Speed Control Mode		Speed Control Range ¹				1:6	000					
ntro		Command Source			Ext	ernal analog comm	and / Internal regis	ers				
)) pa		Smoothing Method				Low-pass and	S-curve filter					
Spee		Torque Limit				Parameter setting	gs / Analog input					
		Bandwidth				Maximum 3.1 kl	Hz (closed-loop)					
				±0.01% at 0% to 100% load fluctuation								
	Spe	eed Calibration Ratio ²	±0.01% at ±10% power fluctuation									
			±0.01% at 0°C to 50°C ambient temperature fluctuation									
de	Analog	Voltage Range	±10VDC									
Torque Control Mode	Command Input	Input Impedance	1ΜΩ									
ontro	три	Time Constant				25	μs					
ne Ca		Command Source			Ext	ernal analog comma	and / Internal regist	ers				
Torqu		Smoothing Method				Low-pa	ss filter					
		Speed Limit	Parameter settings / Analog input									
	A	Inalog Monitor Output		Mon	itor signal can be s	et by parameters (vo	oltage output range	: ±8V); resolution:1	0-bit			
Digital Input/Output		Input	Servo on, Fault reset, Gain switch, Pulse clear, Zero speed clamping, Command input reverse control, Internal position command trigger, Torque limit, Speed limit, Internal position command selection, Motor stop, Speed command selection, Speed / position mode switching, Speed / torque mode switching, Torque / position mode switching, PT / PR command switching, motor override, Forward / reverse limit, Original point, Forward / reverse operation torque limit, Homing activated, E-Cam engage, Forward / reverse JOG input, Event trigger, E-Gear N selection, Pulse input prohibition									
tal Ir						A, B, Z line o	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.									
				Conti	nued on next page							

- 1 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.



AC Servo Drive Specifications

Servo drive specifications (continued)

		SureS	ervo2 Drive	Specificatio	ns Continue	d				
	Model	SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00	
	Protection Function	position 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			RS-485 / Modb	us RTU / USB / Op	tional EtherNet/IP	or Modbus TCP			
	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			(If operating te	0°C to mperature is above	55°C 45°C, forced cooli	ng is required)			
nvirc	Storage Temperature				-20°C 1	o 65°C				
Ē	Humidity				Under 0 - 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 Hz			
	IP Rating				IP	20				
	Power System				TN sys	stem ^{3,4}				
	Approvals			IEC/E	N 61800-5-1, UL 5	508C, TUV (for STC)), CE			

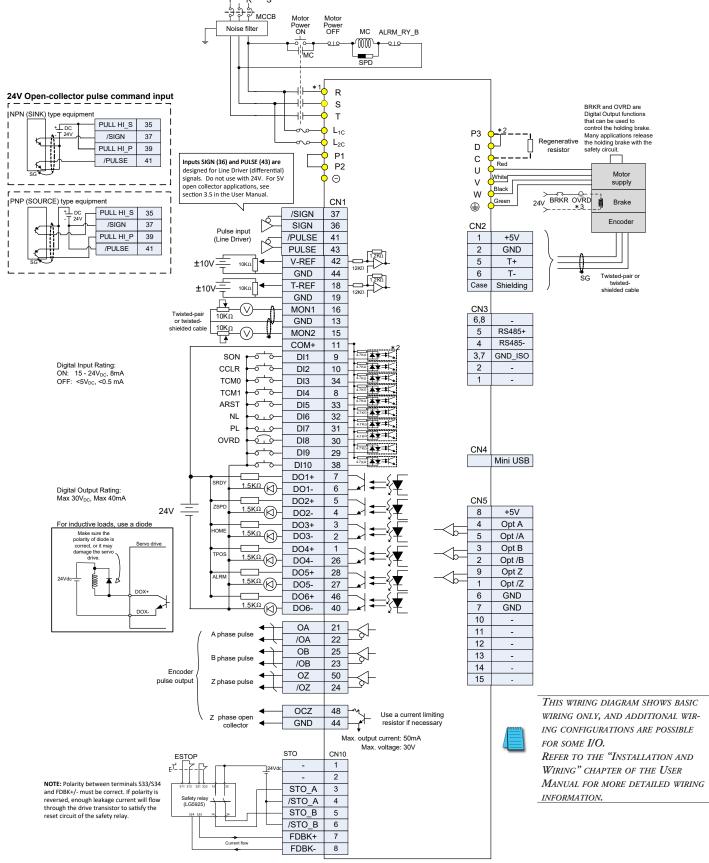
^{3 -} TN system: the neutral point of the power system connects directly to the ground. The exposed metal components connect to the ground through the protective ground conductor.

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



AC Servo System Wiring

Standard wiring example





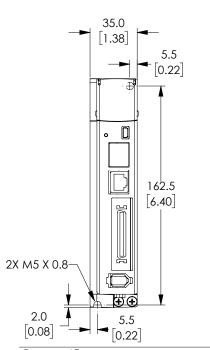
AC Servo System Dimensions

Servo drive dimensions

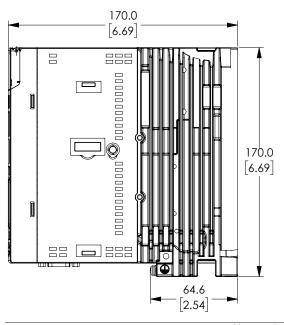
SV2A-2040



FOR ADDITIONAL DIMENSIONS, SEE THE AUTOMATION DIRECT WEBSITE OR CLICK ON THE DRAWING LINKS IN THE SPECIFICATIONS SECTION.







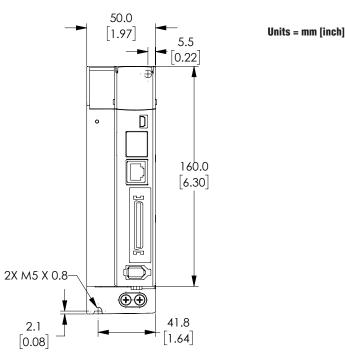


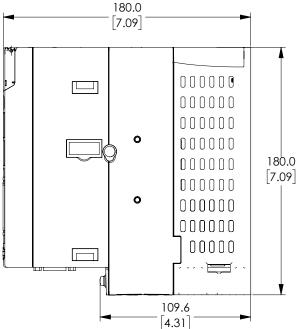
FOR CABINET DEPTH, ADD APPROXIMATELY 100MM (4 INCHES) FOR CN1 (I/O) AND CN2 (ENCODER) CABLE BEND RADIUS.



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.

SV2A-2075, SV2A-2150







FOR CABINET DEPTH, ADD APPROXIMATELY 100MM (4 INCHES) FOR CN1 (I/O) AND CN2 (ENCODER) CABLE BEND RADIUS.



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.



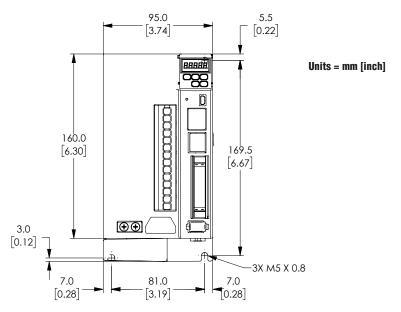
AC Servo System Dimensions

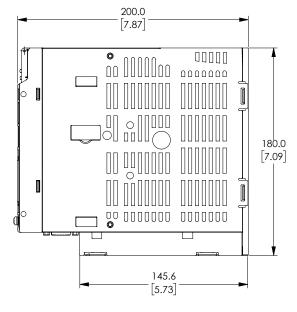
Servo drive dimensions, continued

SV2A-2200, SV2A-2300



FOR ADDITIONAL DIMENSIONS, SEE THE AUTOMATION DIRECT WEBSITE OR CLICK ON THE DRAWING LINKS IN THE SPECIFICATIONS SECTION.



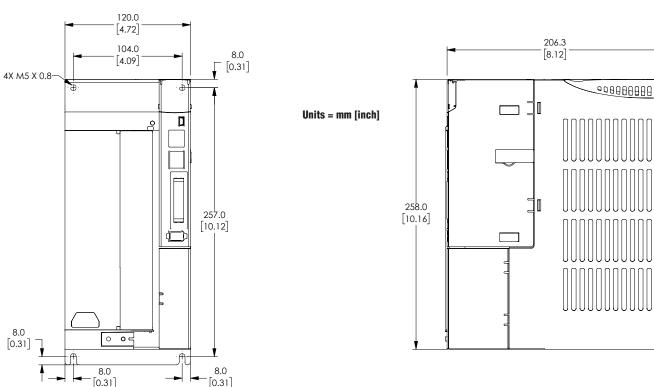


REQUIRES 2" ABOVE AND BELOW THE DRIVE FOR AIR FLOW. FOR PROPER AIR FLOW CLEARANCE, PLEASE SEE SECTION 2.3.1 OF THE SURESERVO2 USER MANUAL.



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

SV2A-2550





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.

273.0

[10.75]



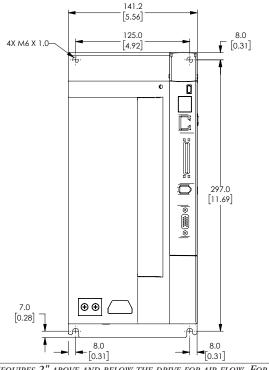
AC Servo System Dimensions

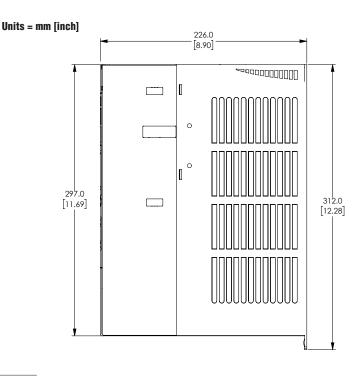
Servo drive dimensions, continued



FOR ADDITIONAL DIMENSIONS, SEE THE AUTOMATION DIRECT WEBSITE OR CLICK ON THE DRAWING LINKS IN THE SPECIFICATIONS SECTION.

SV2A-2750





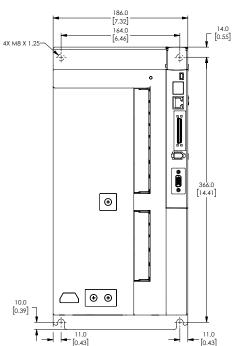


REQUIRES 2" ABOVE AND BELOW THE DRIVE FOR AIR FLOW. FOR PROPER AIR FLOW CLEARANCE, PLEASE SEE SECTION 2.3.1 OF THE SURESERVO2 USER MANUAL.

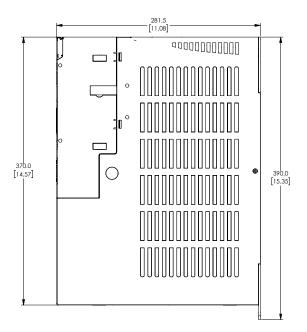


For Cabinet Depth, add approximately 100mm (4 inches) for CN1 (I/O) and CN2 (encoder) cable bend radius.

SV2A-2F00



Units = mm [inch]





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.