

New Information

AF93 to SV9000



The AF93 and SV9000 are both extremely versatile drives, and few difficulties are expected in an application conversion from the former to the latter. The purpose of this selling aid is to point out the major differences in the two products to assist in the conversion of AF93 customers to the newer SV9000 product. The following product characteristics will be considered:

- Physical size
- Terminal strip functionality
- Keypad functionality
- Control type/methods
- Programming software
- Communications options

Physical Size

It should be made clear at the outset that the SV9000 is available in a much wider range of horsepower sizes and voltage ratings than is the AF93. The following comparison is restricted to the available hp sizes of the AF93. The SV9000 is dual rated for VT and CT applications (unlike the AF93), allowing higher continuous amps and increased hp for VT applications. This means that a 2 hp CT/3 hp VT SV9000 will replace a 3 hp CT/3 hp VT AF93. The comparison below shows AF93 VT to SV9000 VT size comparisons.

hp (VT)	Voltage	Product Catalog Designation		
		AF93 NEMA 1 to 25 hp and NEMA 12 to 10 hp W x H x D in Inches	SV9000 Compact NEMA 1 W x H x D in Inches	SV9000 Standard NEMA 1 and NEMA 12 W x H x D in Inches
2	240	5.6 x 8.3 x 6.5	4.7 x 12 x 5.9	4.7 x 15.4 x 8.5 (3 hp)
3		5.6 x 8.3 x 6.5	4.7 x 12 x 5.9	4.7 x 15.4 x 8.5
5		5.6 x 8.3 x 6.5	5.3 x 15.4 x 8.1	6.2 x 20.3 x 9.4
7-1/2		6.6 x 10.6 x 6.9	5.3 x 15.4 x 8.1	6.2 x 20.3 x 9.4
10		6.6 x 10.6 x 6.9	5.3 x 15.4 x 8.1	6.2 x 20.3 x 9.4
2	480	5.6 x 8.3 x 6.5	4.7 x 12 x 5.9	4.7 x 15.4 x 8.5 (3 hp)
3		5.6 x 8.3 x 6.5	4.7 x 12 x 5.9	4.7 x 15.4 x 8.5
5		5.6 x 8.3 x 6.5	4.7 x 12 x 5.9	4.7 x 15.4 x 8.5
7-1/2		6.6 x 10.6 x 6.9	5.3 x 15.4 x 8.1	4.7 x 15.4 x 8.5
10		6.6 x 10.6 x 6.9	5.3 x 15.4 x 8.1	4.7 x 15.4 x 8.5
15		8.4 x 16.3 x 7.4	5.3 x 15.4 x 8.1	6.2 x 20.3 x 9.4
20		8.4 x 16.3 x 7.4	5.3 x 15.4 x 8.1	6.2 x 20.3 x 9.4
25		8.4 x 16.3 x 7.4	7.3 x 22.8 x 8.5	6.2 x 20.3 x 9.4

The SV9000 incorporates a 3% (nominal) line reactor on all models except the compact NEMA 1 in the 4.7" x 12" x 5.9" enclosure. This provides a signifi-

cant advantage in size over the AF93, where an external line reactor or oversized enclosure would have been required in most installations. The

SV9000 standard NEMA 1 and NEMA 12 units include mounting space for a variety of optional printed circuit boards.

Feature Comparison

Primary Design Features	Product Catalog Designation			
	AF93	SV9000 Compact NEMA 1	SV9000 Open/Protected Chassis	SV9000 Standard NEMA 1 or 12

Ratings

hp Range 240 Volts CT (VT)	2 – 10 (2 – 10)	2 – 10 (2 – 10)	2 – 10 (2 – 10)	2 – 10 (2 – 10)
kW Range 380 Volts CT (VT)	N/A	1.5 – 15 (1.5 – 20)	1.5 – 15 (1.5 – 20)	1.5 – 15 (1.5 – 20)
hp Range 480 Volts CT (VT)	2 – 20 (2 – 25)	2 – 20 (2 – 25)	2 – 20 (2 – 25)	2 – 20 (2 – 25)
hp Range 600 Volts CT (VT) ②	N/A	N/A	2 – 20 (2 – 25)	N/A
1-Phase Input Capability with Derate	2 – 10 hp @ 240V	Yes with field modification. Refer to factory.		
50 Hz Ratings	Standard	Standard		
Output: AC Volts Maximum	Input Voltage Base	Input Voltage Base		
Output Frequency Range: Hz	1.6 – 180	.0 – 500		
Initial Output Current (CT)	150%	250% for 2 Seconds		
Overload: 1 Minute (CT/VT)	150% 110% 25 hp Only	150%/110%		
Listings	UL, cUL	UL, cUL, CSA (Pending)		
CE Mark (Requires EMC Filter)	N/A	Standard		

Enclosed Control Features

Enclosure Space Heater	N/A	N/A		
Oversize Enclosure	Optional	Optional		
Output Contactor	Optional ①	Optional ①		
Bypass Control	Optional ①	Optional ①		
EMC Filter	Optional ①	Optional		
Dv/dt Filter	Optional ①	Optional ①		

Protection Features

Incoming Line Fuses	N/A	Optional	
AC Input Circuit Disconnect	Optional ①	Optional ①	N/A
Line Reactors	Optional ①	Standard Internal 3 hp CT and Above Optional Below 3 hp	Standard Internal
Phase Rotation Insensitive	Standard	Standard	
Input Phase Loss Protection	240V – N/A 480V – Standard	Standard	
Input Overvoltage Protection	Standard	Standard	
Line Surge Protection	Standard	Standard	
Output Short Circuit Protection	Standard	Standard	
Output Ground Fault Protection	Standard	Standard	
Output Phase Protection	Standard	Standard	
Overtemperature Protection	Standard	Standard	
DC Overvoltage Protection	Standard	Standard	
Drive Overload Protection	Standard	Standard	
Motor Overload Protection	Standard	Standard	
Fault Alarm Output	Standard	Standard	
Built-In Diagnostics	Standard	Standard	

Input/Output Interface Features

Setup Adjustment Provisions		
Drive Mounted Keypad/Display	Standard	Standard
Remote Keypad/Display	Optional	Optional
Programmer Software	N/A	Standard
Personal Computer	N/A	Standard
Operator Control Provisions		
Drive Mounted Keypad/Display	Standard	Standard
Remote Keypad/Display	Optional	Optional
Conventional Control Elements	Standard	Standard
Keypad Lockout	Standard	Standard
Serial Communications	N/A	Standard
115V AC Control Circuit	Optional	Optional

① Requires optional oversized enclosure.

② UL Listed to 600 volts. Unit is rated to 690 volts.

Feature Comparison (Continued)

Primary Design Features	Product Catalog Designation			
	AF93	SV9000 Compact NEMA 1	SV9000 Open/Protected Chassis	SV9000 Standard NEMA 1 or 12

Input/Output Interface Features (Continued)

Speed Setting Inputs				
Keypad	Standard		Standard	
Potentiometers/Voltage Signal	Standard		Standard	
4 – 20 mA Isolated	Optional		Optional	
4 – 20 mA Differential	Standard		Standard	
3 – 15 psig	Optional		Optional	
Electronic Potentiometer	Standard		Standard	
Preset Speeds	Standard		Standard	
Digital Inputs				
Number of Inputs	8 Non-Programmable		6 Programmable, Additional Optional	
Start	Standard		Programmable	
Stop	Standard		Programmable	
Preset Speeds	7 Standard		7 Programmable	
External Fault	Standard		Programmable	
Forward/Reverse	Standard		Programmable	
2nd Acceleration/Deceleration	Standard		Programmable	
Jog	Standard		Programmable	
Fault Reset	N/A		Programmable	
Speed Source Select	N/A		Programmable	
Start Source Select	N/A		Programmable	
Analog Outputs				
Number of Outputs	2		1 Standard, Additional Optional	
Speed/Frequency	Standard		Standard	
Torque/Load/Current	Programmable		Programmable	
Motor Voltage	Programmable		Programmable	
Kilowatts	Programmable		Programmable	
0 – 10V DC Signals	Standard		Optional	
4 – 20 mA DC Signals	Optional		Standard	
Isolated Signals	Optional		Optional	
Discrete Outputs				
Fault Alarm	Standard		Standard	
Drive Running	Programmable		Standard	
Drive at Set Speed	Programmable		Programmable	
Relay Outputs — Programmable	2		1	
Open Collector Outputs	N/A		1	
Programming Choices	8		14	
Additional Discrete Outputs	N/A		Optional	
Communications				
RS-232	N/A		Standard	
RS-422/485	N/A		Optional	
DeviceNet™	N/A		Refer to Factory	
Modbus RTU	N/A		Optional	
Interbus-S	N/A		Optional	
Profibus-DP	N/A		Optional	
Lonworks	N/A		Optional	
IMPAAC	N/A		Refer to Factory	
Johnson N2	N/A		Refer to Factory	
Staefa P1	N/A		Refer to Factory	
SDS	N/A		Optional	
Performance Features				
Sensorless Vector Control	Standard		Standard	
Closed Loop Vector Control	N/A		Optional	
Volts/Hertz Control	N/A		Standard	
IR and Slip Compensation	N/A		Standard	
Electronic Reversing	Standard		Standard	
Dynamic Braking	Optional		Optional	

Feature Comparison (Continued)

Primary Design Features	Product Catalog Designation			
	AF93	SV9000 Compact NEMA 1	SV9000 Open/Protected Chassis	SV9000 Standard NEMA 1 or 12

Performance Features (Continued)

DC Braking	Standard	Standard
PI Setpoint Controller	Standard	Standard
Critical Speed Lockout	Standard	Standard
Current (Torque) Limit	Standard	Standard
Adjustable Accel/Decel	Standard	Standard
Linear or S Curve Accel/Decel	Standard	Standard
Jog at Preset Speed	Standard	Standard
Automatic Restart	Programmable	Programmable
Coasting Motor Start	Standard	Standard
Coast or Ramp Stop Selection	Standard	Standard
Elapsed Time Meter	Standard	Standard
Carrier Frequency Adjustment	N/A	1 – 16 kHz

Standard Conditions for Application and Service

Operating Ambient Temperature	0 – 50°C NEMA 1 0 – 40°C NEMA 12	-10 – 50°C CT, -10 – 40°C VT
Storage Temperature	-20 – 70°C	-40 – 60°C
Humidity (Maximum), Non-condensing	95%	95%
Altitude (Maximum without Derate)	3300 ft. (1000m)	3300 ft. (1000m)
Line Voltage Variation	+10/-10%	+10/-15%
Line Frequency Variation	47 – 63 Hz	45 – 65 Hz
Efficiency	>96%	>96%
Power Factor (Displacement)	.96	.96

I/O Comparison

Terminal Function	AF93 Terminal Number	SV9000 Terminal Number
	As Shipped from Factory	Standard Application

Analog I/O

4 – 20 Input	1	4 and 5 (Differential Input)
0 – 10V DC Input	3 (Wiper), 4 (10V DC)	2 (Wiper), 1 (10V DC)
Input Common	2	3
0 – 10V DC Output #1	5	Available with Option Boards
0 – 10V DC Output #2	6	
4 – 20 mA Output #1	N/A	18 and 19 (Differential Output)
Analog Output Common	2	N/A

Digital I/O

Digital Common	7	11 and 17
Stop	8	N/A
Start	9	8 or 9 (Programmable)
Fwd/Rev	10	8 Fwd/9 Rev
Acceleration 2/Jog	11	8, 9, 10, 14, 15, 16 Programmable
Preset Speed 1	12	14
Preset Speed 2	13	15
Preset Speed 3	14	8, 9, 10, 14, 15, 16 Programmable
External Fault	15	10
Programmable Output #1	16 and 17	21 (NC), 23 (NO)
Programmable Output #2	17 and 18	24 (NC), 26 (NO)
Programmable Output Common	N/A	22 and 25
C Form Fault (NC)	20	Additional Relay Outputs Available with Option Boards
C Form Fault (NO)	22	
C Form Fault Common	21	

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