

RSI S4 Series Drives

Severe Environment Rated

NEMA 4X Washdown



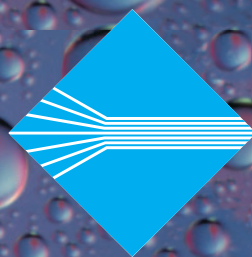
Severe environments certified
NEMA 4X washdown

1000psi contaminant rated

Arctic duty capable

High performance sensorless vector

RSi... *Intuitive* programming structure



BENSHAW
ADVANCED CONTROLS & DRIVES

RSi S4 Drives...

Rugged, Severe Duty NEMA 4X Drives

The S4Series drive is designed for the most severe of environments. The S4 is built standard in an IP66 enclosure, which exceeds the standards for NEMA 1, 12, 4, and 4X. Designed for dirty, wet, and corrosive environments, the S4 is ideal for your toughest applications.



S4...Designed for Severe Environments

- ◆ Standard NEMA 4X/IP66 Enclosure

Suitable for high pressure washdown-
1,000PSI

- ◆ Rugged polycarbonate cover designed to withstand tough environments
- ◆ Double labyrinth seal to keep dust, dirt, oil and water from entering the VFD enclosure
- ◆ ARCTIC Mode maintain safe operating temperature in cold environments



Gasketed seal to withstand 1,000 PSI

Guaranteed...for two full years.

Only Benschaw has a two year guarantee.

Every Benschaw Variable Frequency Drive is guaranteed for two full years. Other manufacturers limit their warranties to just one year. But at Benschaw, we believe that, because we build them better, and we can guarantee them longer. We call that "the Benschaw Promise."



High Performance Drives

For your most demanding applications



S4 Series Drive Family

Frame	Voltage	HP Rating	Height inches (mm)	Width inches (mm)	Depth inches (mm)	Weight pounds (kg)
0	115 Vac	1	9.47 (241)	6.50 (165)	6.08 (155)	8.5 (3.85)
	230Vac	1-3				
	460 Vac	1-3				
1	230Vac	5-7.5	12.01 (306)	8.72 (221)	6.51 (166)	14.0 (6.35)
	460 Vac	5-10				
	600 Vac	1-10				
2	230Vac	10-15	17.375 (435)	10.75 (269)	7.875 (198)	29.5 (13.38)
	460 Vac	15-30				
	600 Vac	15-30				
3	230Vac	20-25	20.19 (513)	11.35 (288)	11.73 (298)	50.0 (22.68)
	460 Vac	40-50				
	600 Vac	40-50				
4	460 Vac	60-100	29.35 (745)	12.84 (326)	13.80 (351)	95.0 (43.1)
	600 Vac	60-100				
5	460 Vac	125-200	51.02 (1296)	16.31 (414)	16.88 (429)	305 (138)
	600 Vac	125-200				

Standard Features:

- ◆ Sensorless Vector Control
- ◆ Standard Dynamic Braking Transistor and Resistor
- ◆ 6 Digital Inputs configurable to 26 different functions
- ◆ High Starting Torque
- ◆ Regenerative software to eliminate regen energy on overhauling loads
- ◆ 2 relays configurable to 32 different functions
- ◆ Standard sequencer software
- ◆ Standard PID control with sleep and wake functions

High Performance Control & Protection with...

Powerful User Interface

The S4 Series drive has an intuitive keypad layout, with a simple, user friendly, menu driven programming structure. The RSi Series VFD is ready to run out of the box for your simple applications or can be custom configured for your most demanding applications and control strategies...



RSi...intuitive programming structure

Over 250 Programmable Parameters

Configuration groups in straight line, numerical sequence

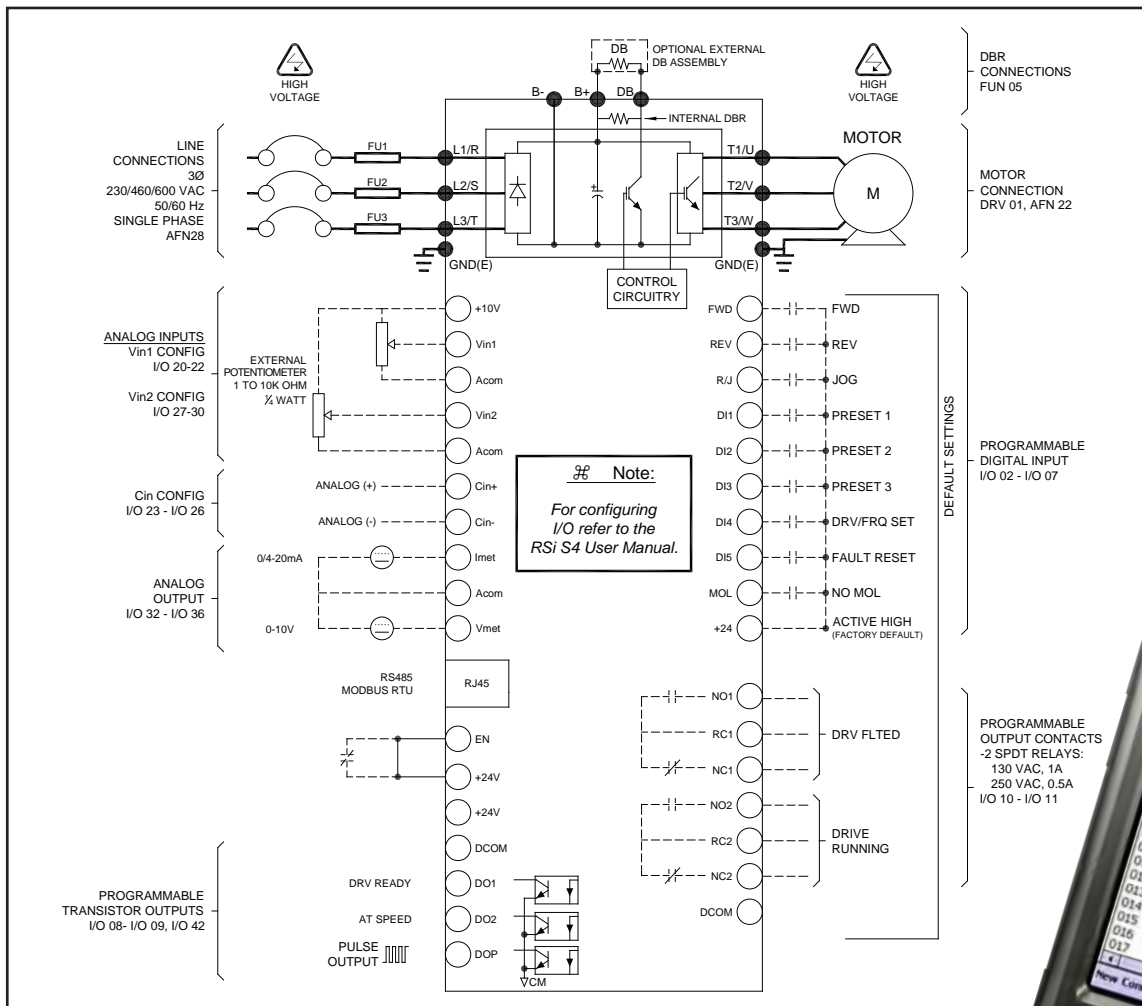
DRIVES GROUP	FUNCTION GROUP	ADVANCED FUNCTION GROUP	I/O GROUP
<ul style="list-style-type: none"> ◆ Set Speed ◆ Acceleration Time ◆ Deceleration Time ◆ Motor Amps ◆ Start / Stop Method ◆ Speed Control Method ◆ Monitor Current ◆ Monitor Power ◆ Monitor DC Bus ◆ Monitor KWh ◆ Monitor MWh ◆ Monitor Run Time ◆ Monitor Power On Time ◆ Monitor Drive Temp ◆ Monitor Load Torque 	<ul style="list-style-type: none"> ◆ V/Hz Pattern ◆ Dynamic Braking Configuration ◆ DC Injection Braking Configuration ◆ Current Limit ◆ Skip Frequencies ◆ Timers ◆ Password Selection ◆ Motorized Pot ◆ Automatic Restart ◆ Set Current Levels ◆ Set Frequency Levels ◆ Set Torque Levels ◆ Set User Units 	<ul style="list-style-type: none"> ◆ Advanced Function Group ◆ Minimum Frequency ◆ Maximum Frequency ◆ Carrier Frequency ◆ Voltage Boost ◆ Sensorless Vector Parameters ◆ Speed Search ◆ PID Control ◆ Enable Keypad Functions ◆ Alternate ramp Selection ◆ Phase Loss ◆ Motor Overload ◆ Sleep Function ◆ Factory Reset ◆ Store/Load Parameters 	<ul style="list-style-type: none"> ◆ Analog Input Bias and Gain ◆ Digital Input Function Selection ◆ Relay Output Function Selection ◆ Analog Output Bias and Gain ◆ Analog Output Function ◆ Loss of Analog Input Signal ◆ Communication Options ◆ Preset Speeds ◆ Monitor I/O Status

... Flexible, Configurable I/O

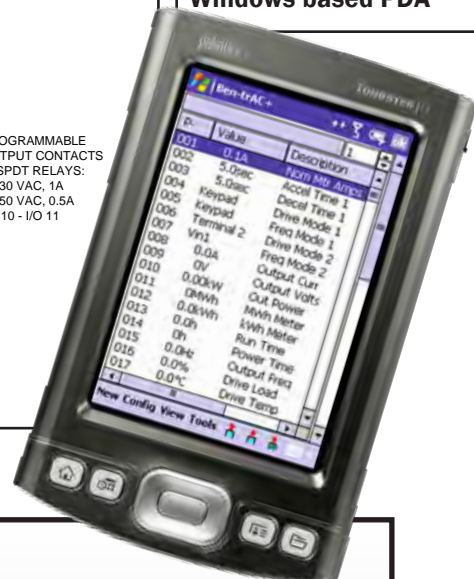
To meet your requirements

The S4 drive has a powerful set of I/O parameters designed to match the most demanding applications. The drive is provided with a full range of analog and digital I/O, all fully configurable and scalable.

S4 Series Wiring Diagram



Standard infrared port to communicate to a Windows based PDA



I/O Functionality

<p>3 Analog Inputs Configurable to: 0-10 Vdc 4-20mA -10 to +10Vdc pulse input</p>	<p>2 Analog Outputs (1) 0 - 10Vdc (1) 4 - 20mA Configurable to: Frequency Torque Current Voltage Power DC Bus Voltage PID Feedback</p>	<p>10 Digital Inputs Configurable to: Forward Run Reverse Run Jog Preset Speeds Timer Function External Trip PID Disable Motorized Pot Fault Reset Alternate Ramps DC Injection</p>	<p>2 Relay Outputs Configurable to: Running Faulted At Speed Ready Running Forward Running Reverse PID Limits Timers Loss of Reference Above Speed Below Speed</p>
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RSi S4 Series Specifications

Environmental Specifications

Operating temperature	For 0032W, 0052W, 0302W, 0304W, 0056W, 0306W models: -10°C to +35°C (14°F to 95°F) For all other models: -10°C to +40°C (14°F to 104°F)
Storage temperature	-20°C to +65°C (-4°F to 149°F)
Humidity	0% to 95% non-condensing
Altitude	1000m (3300ft) without derating
Maximum vibration	per En50178 (1g @ 57-150 Hz)
Acoustic noise	80 dBa sound power at 1m (3ft) maximum
Cooling	1 to 5 HP models: Natural convection 7.5 to 50.0 HP models: Forced air Note: 600Vac 5 HP model has a fan

Electrical Specifications

Input Voltage	115V models: 115 Vac, 1 phase, ±10 230V models: 200-230 Vac, 3 phase, ±15% 460V models: 380-460 Vac, 3 phase, ±15% 600V models: 600 Vac, 3 phase, +10 -15%			
Line Frequency	50 / 60Hz ± 2Hz			
Source kVA (max)	10 times the unit rated kVA (see note below)			
DC Bus voltage for:	<u>115VAC models</u>	<u>230VAC models</u>	<u>460VAC models</u>	<u>600VAC models</u>
Overvoltage Trip	406 VDC	406 VDC	814 VDC	1017 VDC
Dynamic Brake Activation	388 VDC	388 VDC	776 VDC	970 VDC
Nominal Undervoltage (UV) Trip	199 VDC	199 VDC	397 VDC	497 VDC
Control System	V/Hz or SVC Carrier frequency = 1-16 kHz, programmable			
Output Voltage	0 to 100% of line voltage, 3 phase			
Overload Capacity	120% of rated normal duty rms current for 60 seconds 150% of rated heavy duty rms current for 60 seconds			
Frequency Range	0.1 to 400 Hz			
Frequency Stability	0.1 Hz (digital), 0.1% (analog) over 24 hours ±10°C			
Frequency setting	By keypad or by external signal (Speed Pot 0 to 5VDC; 1 to 10VDC; 0 to 20mA, or 4 to 20mA) OR by pulse train up to 100 kHz			

Control Features Specifications

Vin1 reference input	0-5/10 Vdc, 0/4-20 mAdc (250 Ohm load) 6FS pulse train input, 0-1/10/100 kHz pulse input, inverted function, 0-5 bipolar input, broken wire detection. Span and offset adjustment.
Vin2 reference input	0-5/10 Vdc, 0-5-10 bipolar input, inverted function, broken wire detection, span and offset adjustment. Programmable for frequency reference or current limit input.
Cin reference input	0/4 mAdc (50 Ohm load), inverted function, span and offset adjustment. Programmable for frequency reference or current limit input.
Reference voltage	10 Vdc (10 mAdc maximum)
Digital inputs - 10	Off=0 to 3 Vdc; On=10 to 32 Vdc (pullup logic), selectable between pullup and pulldown logic.
Digital supply voltage	24 Vdc (150 mA maximum)
Preset frequencies	3 inputs for seven preset frequencies (selectable)
Digital outputs	2 SPDT relay output - 130 Vac, 1 A/250 Vac, 0.5 A 2 open collector outputs 50 mA per device
Digital pulse train output	Open collector output pulse train proportional to output frequency.
Vmet analog output	0 to 10 Vdc (5mAdc maximum)
Imet analog output	0-20 mAdc output into a 500 Ohm load (maximum)
DC holding / injection braking	At start, stop, by frequency with adjustable current level and time or continuous DC injection by digital input.
Current limit	Four quadrant adjustable from 5 to 150%.
Speed ramp	Primary and alternative adjustable from 0.1 to 3200 seconds.
Voltage boost	Fixed boost adjustable from 0% to 50% or auto boost.
Voltage characteristic (V/Hz)	Linear, pump, fan or 2-piece linear.
Timed overload	Adjustable inverse time trip (shear pin, 30 sec, 60 sec, 5 min), standard or inverter-duty motors.
Protective features	Overcurrent, overvoltage fault, ground fault, short circuit, dynamic brake overload, drive temperature, power wiring fault, drive timed overload, input voltage quality, overvoltage ridthrough.
Program Sequence Logic Controller (PSLC)	9-step PLC type functionally that can control speed, direction, and ramps based on time, analog input, digital input, or pulse input.

RSi S4 Series Ratings

115 VAC Ratings

Model Number	Frame Size	Normal Duty		Input Current (A)		Output Current (A)		Heavy Duty		Input Current (A)		Output Current (A)	
		HP	kW	-	115 VAC	-	230 VAC	HP	kW	-	115 Vac	-	230 VAC
RSi001S415W	0	1.0	0.75	-	0.75	-	4.2	0.5	0.37	-	11	-	2.2

230 VAC Ratings

Model Number	Frame Size	Normal Duty		Input Current (A)		Output Current (A)		Heavy Duty		Input Current (A)		Output Current (A)	
		HP	kW	200 VAC	230 VAC	200 VAC	230 VAC	HP	kW	200 VAC	230 VAC	200 VAC	230 VAC
RSi001S42W	0	1.0	0.75	5.6	4.8	4.8	4.2	0.5	0.37	2.9	2.5	2.5	2.2
RSi002S42W	0	2	1.5	9	7.8	7.8	6.8	1	0.75	5.6	4.8	4.8	4.2
RSi003S42W	0	3	2.2	12.7	11	11	9.6	2	1.5	9	7.8	7.8	6.8
RSi003S42W	1	5	4	20.2	17.5	17.5	15.2	3	2.2	12.7	11	11	9.6
RSi005S415W	1	7.5	5.5	29.2	25.3	25.3	22	5	4	20.2	17.5	17.5	15.2
RSi006S415W	2	10	7.5	37.2	32.2	32.2	28	7.5	5.5	29.2	25.3	25.3	22
RSi007S415W	2	15	11	52.1	46.4	48.3	42	10	7.5	37.2	32.2	32.2	28
RSi008S415W	3	20	15	68.3	57.4	62.1	54	15	11	52.1	46.4	48.3	42
RSi001S415W	3	25	18.5	82.3	73.8	78.2	68	20	15	68.3	57.4	62.1	54
RSi001S415W	3	30	22.5	96	84	92	80	25	18.5	82.3	73.8	78.2	68

460 VAC Ratings

Model Number	Frame Size	Normal Duty		Input Current (A)		Output Current (A)		Heavy Duty		Input Current (A)		Output Current (A)	
		HP	kW	380 VAC	460 VAC	380 VAC	460 VAC	HP	kW	380 VAC	460 VAC	380 VAC	460 VAC
RSi001S44W	0	1	0.75	3	2.4	2.4	2.1	0.5	0.37	1.6	1.3	1.3	0.9
RSi002S44W	0	2	1.5	5.2	3.9	3.8	3.4	1	0.75	3	2.4	2.4	2.1
RSi003S44W	0	3	2.2	7.2	5.6	5.1	4.8	2	1.5	5.2	3.9	3.8	3.4
RSi005S44W	1	5	4	12	8.8	8.9	7.6	3	2.2	7.2	5.6	5.1	4.8
RSi007S44W	1	7.5	5.5	15	12.8	12	11	5	4	12	8.8	8.9	7.6
RSi010S44W	1	10	7.5	19.7	16.3	15.6	14	7.5	5.5	15	12.8	12	11
RSi015S44W	2	15	11	30.9	25.8	23	21	10	7.5	19.7	16.3	15.6	14
RSi020S44W	2	20	15	40	33.3	31	27	15	11	30.9	25.8	23	21
RSi025S44W	2	25	18.5	46.3	40	37	34	20	15	40	33.3	31	27
RSi030S44W	2	30	22	57.5	47.8	43	40	25	18	46.3	40	37	34
RSi040S44W	3	40	30	73	62	61	52	30	22	57.5	47.8	43	40
RSi050S44W	3	50	37	82	78	71	65	40	30	73	62	61	52
RSi060S44W	4	60	45	94	80	86	77	50	37	82	78	71	65
RSi075S44W	4	75	55	114	99	105	96	60	45	94	80	86	77
RSi100S44W	4	100	75	149	129	140	124	75	55	114	99	105	96
RSi125S44W	5	152	90	168	156	168	156	100	75	140	124	140	124
RSi150S44W	5	150	110	205	180	205	180	125	90	168	156	168	156
RSi200S44W	5	200	132	240	240	240	240	150	110	205	180	205	180

600 VAC Ratings

Model Number	Frame Size	Normal Duty		Input Current (A)		Output Current (A)		Heavy		Input Current (A)		Output Current (A)	
		HP	kW	-	600 VAC	-	600 VAC	HP	kW	-	600 VAC	-	600 VAC
RSi001S46W	0	1	0.75	-	2.0	-	1.7	0.5	0.37	-	1.2	-	0.9
RSi002S46W	0	2	1.5	-	3.6	-	2.7	1	0.75	-	2.0	-	1.7
RSi003S46W	0	3	2.2	-	5.0	-	3.9	2	1.5	-	3.6	-	2.7
RSi005S46W	1	5	4	-	7.6	-	6.1	3	2.2	-	5.5	-	3.9
RSi007S46W	1	7.5	5.5	-	10.4	-	9.0	5	4	-	7.6	-	6.1
RSi010S46W	1	10	7.5	-	14.1	-	11.0	7.5	5.5	-	10.4	-	9.0
RSi015S46W	2	15	11	-	23	-	17	10	7.5	-	14.1	-	11
RSi020S46W	2	20	15	-	31	-	22	15	11	-	23	-	17
RSi025S46W	2	25	18	-	37	-	27	20	15	-	31	-	22
RSi030S46W	2	30	22	-	39.5	-	32	25	18	-	37	-	27
RSi040S46W	3	40	30	-	49	-	41	30	22	-	39.5	-	32
RSi050S46W	3	50	37	-	58	-	52	40	30	-	49	-	41
RSi060S46W	4	60	45	-	68	-	62	50	37	-	58	-	52
RSi075S46W	4	75	55	-	82	-	77	60	45	-	68	-	62
RSi100S46W	4	100	75	-	107	-	99	75	55	-	82	-	77
RSi125S46D	5	152	90	-	125	-	125	100	75	-	99	-	99
RSi150S46D	5	150	110	-	144	-	144	125	90	-	125	-	125
RSi200S46D	5	200	132	-	192	-	192	150	110	-	144	-	144



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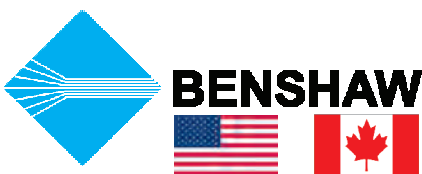
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