

# **RSi SG Series**

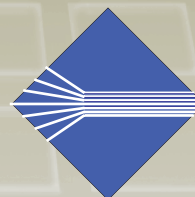
***Sensorless Vector Drives***

***5 to 40HP - 230Volts***

***5 to 700HP - 460Volts***



***...Compact, Rugged,  
High Performance  
Industrial Drives***



**BENSHAW**  
ADVANCED CONTROLS & DRIVES

# RSi SG Drives...

## Flexible, Rugged, Sensorless Vector

The SG Series is a rugged, flexible drive designed for the most demanding applications. The flexible power stack allows the user to apply it to heavy duty loads (150% for 60 secs) or standard duty loads (120% for 60 secs).

With over 250 programmable parameters, the SG Series is configurable for almost any industrial application and is simple and easy to use with the following standard features.

### Flexible, Configurable Standard Features:

- ◆ **Standard I/O:**  
8 digital inputs, 2 analog inputs, 2 analog outputs, 5 relay outputs
- ◆ **Digital Metering:**  
Output current, output frequency, dc link voltage, motor RPM
- ◆ **Protection:**  
Over current, ground fault, over voltage, current limit, motor overload, phase loss, over heat, loss of signal, more
- ◆ **Communications:**  
RS485 standard, Optional Modbus port, optional DeviceNet and other fieldbus
- ◆ **Voltage Tolerance:**  
±10%
- ◆ **V/Hz Patterns:**  
Linear, quadratic, sensorless vector
- ◆ **Analog Output Functions:**  
2 analog outputs 0-10Vdc configurable to motor speed, output current, output voltage, DC link voltage, PID follower
- ◆ **Analog Inputs:**  
4-20mA, 0-10Vdc -10 - +10Vdc
- ◆ **Relay Outputs:**  
1 Form C relay output, 4 Form A relay outputs configurable to running, faulted, ready, at speed, high or low frequency levels, loss of signal, ready, and more
- ◆ **Digital Inputs:**  
8 digital inputs configurable to forward run, reverse run, jog, preset speeds, motorized pot function, emergency stop, alternate ramp selections, HOA, and more
- ◆ **User Interface:**  
2 line, 16 character per line LCD display
- ◆ **Braking Functions:**  
Coast, decel, DC injection braking, Flux braking and optional dynamic braking



### 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."



# Select the Power Rating to Fit Your Application

## Standard and Heavy Duty Ratings

The user can choose from two power ratings to match the specific application requirements. The SG Series Standard Duty rating provides the user with a reliable solution for applications requiring overload protection of 120% for 60 seconds. The heavy duty rating provides the user with a robust power section for loads requiring high starting torque and higher peak overloads of 150% for 60 secs.

Model Number	HP		AMPS		HP		AMPS		Dimensions (in)		
	Variable Torque	Variable Torque	Standard Duty	Standard Duty	Heavy Duty	Heavy Duty	H	W	D		
<b>460 Volts</b>											
RSi007SG-4B	7.5	12	7.5	11	5	8	11.2	5.9	6.2		
RSi010SG-4B	10	16	10	14	7.5	11	11.2	7.9	7.2		
RSi015SG-4B	15	24	15	22	10	17	11.2	7.9	7.2		
RSi020SG-4B	20	30	20	27	15	22	17.9	9.8	7.9		
RSi025SG-4B	25	39	25	35	20	28	17.9	9.8	7.9		
RSi030SG-4B	30	45	30	41	25	34	23.6	12	9.2		
RSi040SG-4B	40	61	40	55	30	44	23.6	12	9.2		
RSi050SG-4B	50	75	50	68	40	55	25.3	12.1	10.1		
RSi060SG-4B	60	91	60	83	50	66	25.3	12.1	10.1		
RSi075SG-4B	75	110	75	100	60	80	25.3	12.1	11.2		
RSi100SG-4B	100	152	100	139	75	111	30.2	14.5	12.1		
RSi125SG-4B	125	183	125	167	100	134	30.2	14.5	12.1		
RSi150SG-4	150	223	150	204	125	164	30.3	20.1	16.6		
RSi200SG-4	200	264	200	242	150	194	30.3	20.1	16.6		
RSi250SG-4	250	325	250	302	200	240	32.3	20.1	16.6		
RSi350SG-4	350	432	300	396	250	317	40.5	27.2	17.3		
RSi400SG-4	400	547	400	501	300	401	40.5	27.2	17.3		
RSi500SG-4	500	613	450	562	350	450	43.7	30.8	17.4		
RSi600SG-4	600	731	500	670	400	536	51.3	36.3	19.5		
RSi700SG-4	700	877	600	804	500	643	51.3	36.3	19.5		
<b>230 Volts</b>											
RSi007SG-2B	7.5	24	7.5	22	5	17	11.2	5.9	6.2		
RSi010SG-2B	10	32	10	29	7.5	23	11.2	7.9	7.2		
RSi015SG-2B	15	46	15	42	10	33	11.2	7.9	7.2		
RSi020SG-2B	20	60	20	55	15	44	17.9	9.8	7.9		
RSi025SG-2B	25	74	25	67	20	54	17.9	9.8	7.9		
RSi030SG-2B	30	88	30	80	25	68	23.6	12	9.2		
RSi040SG-2B	40	115	40	105	30	84	23.6	12	9.2		

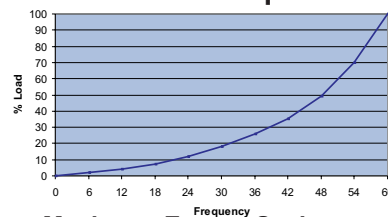
\* Units ending in B are in a NEMA 1 Enclosure  
Units not ending in a B are in a protected chassis unit.



## Standard Duty

The standard duty rating provides an overload of 120% current for 60 seconds. Energy savings can be optimized by setting the V/Hz pattern to variable Torque for fan and pump applications.

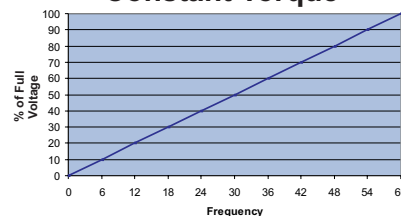
### Variable Torque



### Maximum Energy Savings

Torque can be maintained throughout the speed range by setting the V/Hz pattern to Constant Torque.

### Constant Torque

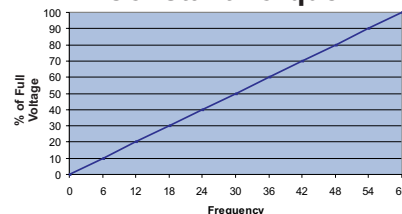


### Precise Speed Control

## Heavy Duty

The Heavy Duty rating provides an overload of 150% current for 60 seconds. Torque can be maintained throughout the speed range by setting the V/Hz pattern to Constant Torque. The Heavy Duty rating will provide additional starting torque and increase the peak overload capability.

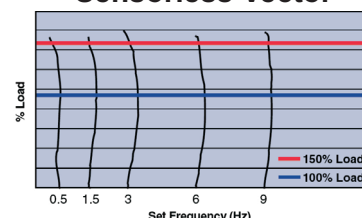
### Constant Torque



### Precise Speed Control

Sensorless Vector Control provides precise speed and torque control throughout the speed range. A sophisticated auto-tuning algorithm senses the internal motor parameters to optimize performance.

### Sensorless Vector

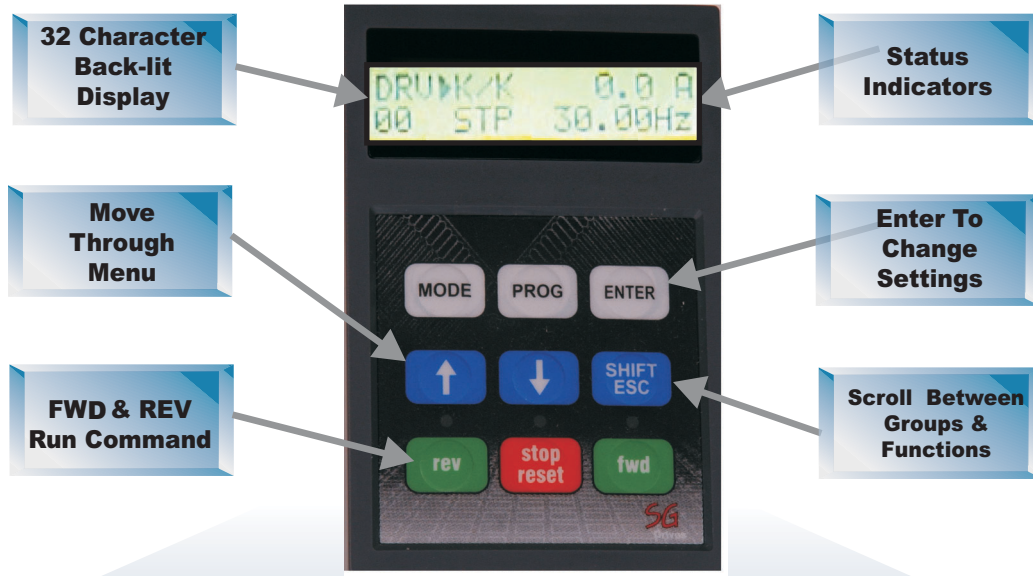


### Precise Speed & Torque Control

# High Performance Control & Protection with...

## Powerful User Interface

The SG 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...



## Over 250 Programmable Parameters

Configuration groups in straight line, numerical sequence

### DRIVES GROUP

- ◆ Set Speed
- ◆ Acceleration Time
- ◆ Deceleration Time
- ◆ Motor Amps
- ◆ Start/Stop Method
- ◆ Speed Control Method
- ◆ Motor Overload Protection
- ◆ Meters
- ◆ Preset Speeds

### FUNCTION GROUP

- ◆ Stop Mode Method
- ◆ Start Mode Method
- ◆ DC Injection Braking
- ◆ Power Outage Ride Thru
- ◆ Minimum Frequency
- ◆ Maximum Frequency
- ◆ Volts/Hz Pattern
- ◆ Phase Loss Detection

### ADVANCED FUNCTION GROUP

- ◆ Fault Log
- ◆ Jump Frequencies
- ◆ Automatic Restart
- ◆ Speed Search (Flying Start)
- ◆ Carrier Frequency Adjustment
- ◆ Sensorless Vector Control Selection
- ◆ Run Time Monitor
- ◆ Factory Reset
- ◆ Password Lockout

### I/O GROUP

- ◆ Analog Input Bias and Gain
- ◆ Digital Input Function Selection
- ◆ Relay Output Function Selection
- ◆ Analog Output Bias and Gain
- ◆ Analog Output Function
- ◆ Internal Fan Control
- ◆ Loss of Analog Input Signal
- ◆ Communication Options

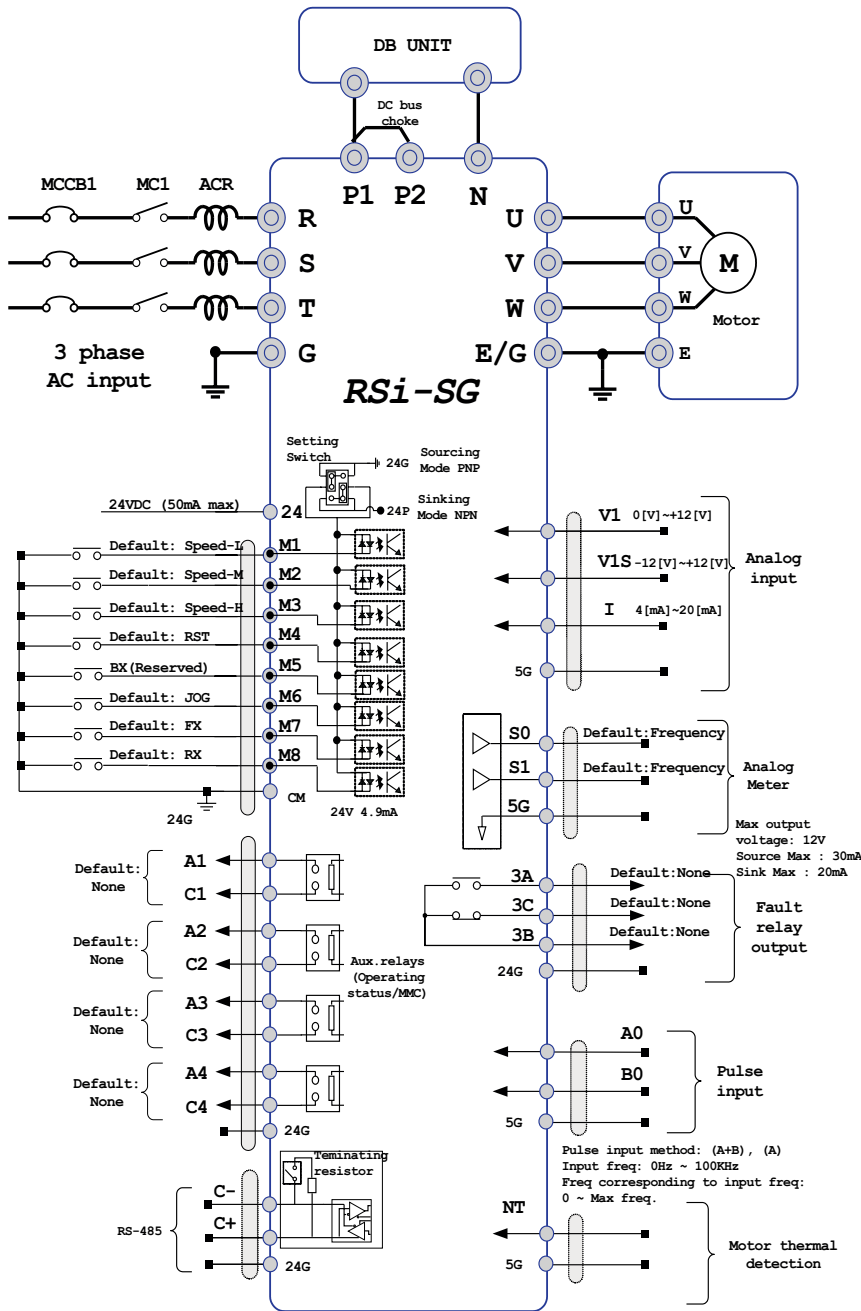
### APPLICATION GROUP

- ◆ PID Control
- ◆ Multiple Motor Control
- ◆ Sleep Mode Select

# ... Flexible, Configurable I/O

## To Match Your Most Demanding Applications

The SG 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.



## I/O Functionality

### 2 Analog Inputs - Scalable

0 - 10Vdc or -10 to 10Vdc  
4-20mA

### 2 Analog Outputs

0-10Vdc  
Configurable to:  
Frequency  
Voltage  
Current  
DC Link Voltage  
PID Output

### 8 Digital Inputs

Configurable to:  
15 Preset Speeds  
7 Acceleration Times  
7 Deceleration Times  
DC Injection Braking  
2nd Set of Motor Parameters  
Motorized Pot Function  
3 Wire Start/Stop  
2 Wire Start/Stop  
Motor Preheat Function  
Local/Remote Selection  
External Fault  
Remote Reset  
Reverse Operation  
Jog Function  
PID Control On/Off

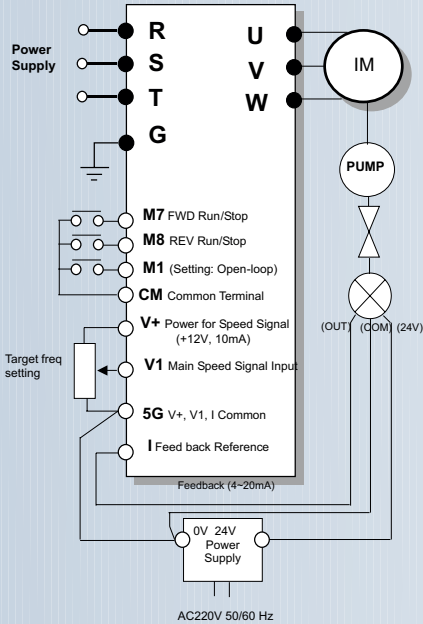
### 5 Relay Outputs

1 Form C  
4 form A  
Configurable to:  
Overload Pre-alarm  
Above Frequency Level Indication  
Below Frequency Level Indication  
Stall Mode Active  
Loss of Signal Indication  
Running  
Faulted  
Steady State Indication  
Ready Indication  
Multiple Motor Control  
Overvoltage Detection  
Low Voltage Detection  
Stop Indication

# Built In Fan & Pump Control

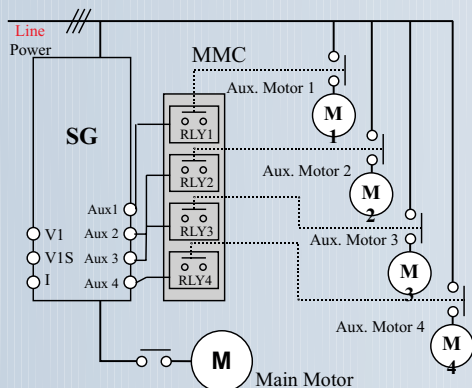
*Easy to Use Solutions to Match Your Application*

## “Real Values” PID



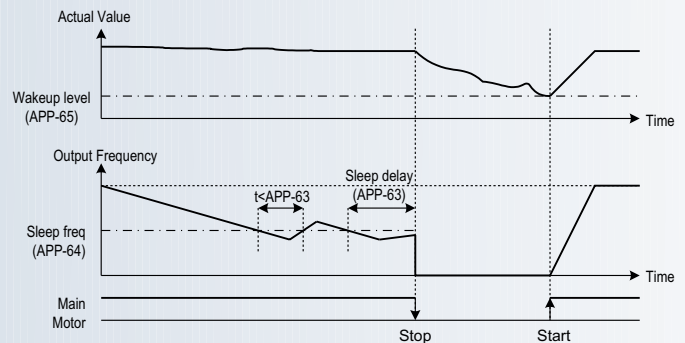
The SG drive includes an integrated PID control algorithm to control pressure, temperature, or flow in pumping and fan applications. The PID process variable can be set in real values, eliminating the need for confusing conversions.

## Multiple Motor Control



The SG drive includes an integrated Multiple Motor Control (MMC) algorithm to control several motors from one VFD. The SG drive will use one main motor to regulate a system process variable. When the main motor can no longer achieve the process variable, a signal is sent to start an auxiliary motor. Up to 4 additional motors can be controlled from the SG Drive.

## Sleep Functions



The “Sleep” function is activated when flow demand is low. The drive will decelerate and enter the “Sleep” state. The drive will stop the motor and monitor the system. When a higher flow demand returns, the drive will “Wake-UP” and return to controlling the process variable.

# Engineered Drive Solutions

*Designed & Built to Your Specifications*

Benshaw is the recognized industry leader in quick shipment of engineered drives with a state-of-the-art factory, dedicated engineering teams and a complete inventory of the components necessary to build any engineered solution you require. Select the enclosure, disconnect, bypass, pilot devices, control strategy and magnetics required to meet your most demanding applications. Benshaw will deliver your drive solution when you need it!



1

## Select Horsepower & Voltage

2

## Select Enclosure

- ◆ NEMA 1, 12, 3R, 4
- ◆ Custom Enclosures
- ◆ Custom A/C, Heat Exchangers

3

## Select Disconnect

- ◆ None
- ◆ Circuit Breaker
- ◆ Fused Disconnect

4

## Select Bypass

- ◆ None
- ◆ 2 Contactor
- ◆ 3 Contactor
- ◆ Solid State

5

## Select Pilot Devices

- ◆ None
- ◆ Indicating Lights
- ◆ Selectable Switches
- ◆ Speed Potentiometer
- ◆ Pushbuttons
- ◆ Others Specified

6

## Select Control Devices

- ◆ None
- ◆ Control Transformer
- ◆ Auxilliary Relays

7

## Select Line Reactor

- ◆ None
- ◆ 3% Reactor
- ◆ Custom Reactor

8

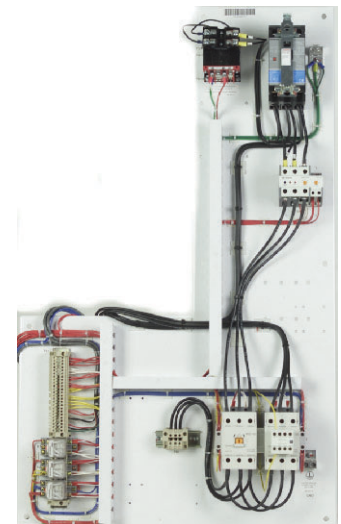
## Select Long Lead Filter

- ◆ None
- ◆ Long Lead Filter
- ◆ Custom Filter

9

## Select Operator Interface

- ◆ Standard Keypad - 2 Line x 16 Character
- ◆ Voltmeter, Ammeter, % Speed Meter, etc...



**Typical Electrical Control Module**



**Drive & Control Modules with Interwiring**

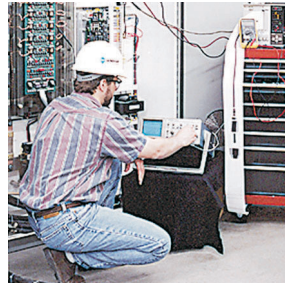
# The widest range of motor controls and drives available anywhere...

- ◆ Solid state starters fractional up to 60,000 HP at 15kV
- ◆ AC drives to 1000 HP
- ◆ Electromechanical controls to 800 amps



**Repairs** are made on Benshaw and third-party equipment by trained, experienced personnel, using the latest diagnostic and test equipment to repair:

- ◆ Printed circuit boards.
- ◆ Power electronic control assemblies.
- ◆ Electrical control assemblies.



**Field Services** are performed on-site by skilled technicians, engineers or complete teams, if needed, including:

- ◆ Start-up commissioning.
- ◆ Field repairs.
- ◆ Field analysis/data collection.
- ◆ Preventative maintenance.



**Training** is provided in both a classroom and a hands-on environment that provides the student with practical skills, including:

- ◆ Basic electrical maintenance.
- ◆ Electronic maintenance and diagnostics.
- ◆ Benshaw product courses.
- ◆ Customized systems courses (maintenance- or operations-based).

## 7x24 customer service...

Benshaw's customer service organization is dedicated to providing comprehensive 7-day-a-week, 24-hour-a-day phone support, repairs, spare parts, field engineering, retrofits and training services...when and where you need us. Whether it's Benshaw or third-party equipment, you can count on our experienced team, backed by the latest diagnostics and repair tools and a two million dollar parts inventory to support your operations.

**7x24 Hotline Support** from our operations in Pittsburgh, Listowel (Canada), Detroit and Phoenix, including:

- ◆ Technical phone support.
- ◆ Overnight parts shipment.
- ◆ 24-hour service dispatch.
- ◆ Coordination of all service capabilities.



**Benshaw Express** is a new worldwide program that guarantees a two-hour emergency response on a variety of starters, drives and parts from our dedicated warehouse at the airport. It includes:

- ◆ 7x24 Same day shipment.
- ◆ Either air or truck delivery.
- ◆ Airport pick-up or door-to-door service.



## Sales & Service

### United States

Pittsburgh, Pennsylvania  
Dayton, Ohio  
Syracuse, New York  
Boston, Massachusetts  
Wilmington, Delaware  
Charlotte, North Carolina  
Jacksonville, Florida  
Birmingham, Alabama  
Los Angeles, California  
San Francisco, California  
Detroit, Michigan  
LaCrosse, Wisconsin  
Chicago, Illinois  
Kansas City, Missouri  
Phoenix, Arizona  
Seattle, Washington  
Denver, Colorado  
Houston, Texas  
Minneapolis, Minnesota  
Newark, New Jersey

### Canada

Listowel, Ontario  
Toronto, Ontario  
Montreal, Quebec  
Calgary, Alberta

### South America

Sao Paulo, Brazil  
Santiago, Chile  
Lima, Peru  
Bogota, Colombia

### Shanghai

### Australia

### Singapore

**Visit or E-mail Benshaw on the worldwide web at [www.benshaw.com](http://www.benshaw.com), [benshawexpress.com](http://benshawexpress.com), or contact:**

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