RSGT



Three phase AC motor soft starter







Benefits

- **Easy to use.** RSGT is equipped with a self-learning algorithm that automatically adjusts the start parameters to optimise the motor starts and stops.
- Fast installation and set-up. Only 3 settings are required (FLC, ramp-up and ramp-down).
- Compact dimensions. 12 25 Arms in 45mm wide housing, 32 55 Arms in 75mm wide housing, 70 90 Arms in 120mm housing.
- Integrated protection. Diagnostic functions provide additional protection. RSGT is also equipped with an overload protection (Class 10).
- Less stresses on motors. The control on all the 3-phases results in better current reduction and no current imbalance during motor start.
- Torque control during ramp-down. Smoother deceleration of the load.
- Load condition monitoring. The RSGT is equipped with a Modbus/RTU communication port (2-wire connection).
- Guided model selection. Easy to use selection tool to select the appropriate soft starter model depending on the application type.

Description

RSGT is an extremely compact and easy to use 3-phase soft starter for AC induction motors rated up to 90 Arms. The starting parameters can be easily set-up through 3 selector switches.

The integrated motor overload protection (Class 10) and Modbus communication result in a higher installation flexibility.

Applications

RSGT soft starters are the ideal solution for 3-phase fixed speed AC induction motor applications where there is the need to reduce the starting current and/or minimise stresses on the motor during start and stop.

The RSGT offers a number of integrated diagnostic functions that can replace additional components inside the electrical panel.

Typical applications include: compressors, pumps and fans.

Main functions

- · Soft starting and soft stopping of AC motors
- Integrated electronic overload protection (Class 10)
- · Wrong phase sequence detection
- Torque control during ramp-down
- Top of ramp and alarm relay indication
- · Dry run detection for pumps
- Serial communication (Modbus) over RS485



References

Ord	er code		
₫ R	SGT 🔲	00v1000	
Enter the	code ente	ering the corresponding option instead of	
Code	Option	Description	Notes
R			
S	-	Soft starter	
G	-	General purpose	
Т	-	Three phase control	
	40	220 – 400 VAC +10% -15% operational voltage (Ue)	
	60	220 – 600 VAC +10% -15% operational voltage (Ue)	
	12	12 Arms	

	Option		110100			
R	-					
S	-	Soft starter				
G	-	General purpose				
Т		Three phase control				
	40	220 – 400 VAC +10% -15% operational voltage (Ue)				
	60	220 – 600 VAC +10% -15% operational voltage (Ue)				
	12	12 Arms				
	16	16 Arms				
	25	25 Arms				
	32	32 Arms	Rated operational current			
	45	45 Arms	@ 40 °C			
	55	55 Arms				
	70	70 Arms				
	90	90 Arms				
	E0	110 - 400 VAC (+10%, - 15%) control voltage (Uc) Supply voltage: internally supplied	DSCT40 models only			
	F0	24 VAC/DC (+10%, - 10%) control voltage (Uc) Supply voltage: internally supplied	RSGT40 models only			
ш	FF	24 VAC/DC (+10%, - 10%) control/supply voltage Supply voltage: externally supplied	DOOTCO			
	GG	100 - 240 VAC (+10%, - 15%) control/supply voltage Supply voltage: externally supplied	RSGT60 models only			
V	-					
1	-	With integrated motor overload protection (Class 10)				
	0	No PTC	RSGT 45 mm models			
	1	With PTC	RSGT 75/120 mm models			
	-	No fan	RSGT 45 mm models			
	0	INO IAII	RSGT 32 Arms models only			
	1	With fan	RSGT 45 Arms to RSGT 90 Arms models			
	-	Without communication				
	С	With Modbus communication				



Selection guide

		Operational vo	Itage: 400 VAC	Operational vo	ltage: 600 VAC
Rated operational current (le)	Modbus	Control voltage 110 - 400 VAC	Control voltage 24 VAC / DC	Control/supply voltage 100 - 240 VAC	Control/supply voltage 24 VAC / DC
12 Arms		RSGT4012E0V10	RSGT4012F0V10	RSGT6012GGV10	RSGT6012FFV10
16 Arms	No	RSGT4016E0V10	RSGT4016F0V10	RSGT6016GGV10	RSGT6016FFV10
25 Arms		RSGT4025E0V10	RSGT4025F0V10	RSGT6025GGV10	RSGT6025FFV10
12 Arms		RSGT4012E0V10C	RSGT4012F0V10C	RSGT6012GGV10C	RSGT6012FFV10C
16 Arms		RSGT4016E0V10C	RSGT4016F0V10C	RSGT6016GGV10C	RSGT6016FFV10C
25 Arms		RSGT4025E0V10C	RSGT4025F0V10C	RSGT6025GGV10C	RSGT6025FFV10C
32 Arms	Yes	RSGT4032E0V110C	RSGT4032F0V110C	RSGT6032GGV110C	RSGT6032FFV110C
45 Arms	res	RSGT4045E0V111C	RSGT4045F0V111C	RSGT6045GGV111C	RSGT6045FFV111C
55 Arms		RSGT4055E0V111C	RSGT4055F0V111C	RSGT6055GGV111C	RSGT6055FFV111C
70 Arms		RSGT4070E0V111C	RSGT4070F0V111C	RSGT6070GGV111C	RSGT6070FFV111C
90 Arms		RSGT4090E0V111C	RSGT4090F0V111C	RSGT6090GGV111C	RSGT6090FFV111C

Further reading

Information	Where to find it	QR
RSGT 45 mm instruction manual	http://cga.pub/?6ca01b	
RSGT 75/120 mm instruction manual	http://cga.pub/?974b29	
RSGT troubleshooting guide	http://cga.pub/?11a31f	
RSGT 45mm Monitor software	http://cga.pub/?afe4f5	
CAD drawings (RSGT 45 mm)	http://cga.pub/?bf3bed	
CAD drawings (RSGT 75 mm)	http://cga.pub/?ee18e7	
CAD drawings (RSGT 120 mm)	http://cga.pub/?420858	
Modbus communication protocol	http://cga.pub/?8a5887	



Selection guide and typical application settings

Category	Туре	Trip Class	Ramp-up setting [s]	Ramp-down setting [s]
	Scroll compressor	5	1	0
C	Screw compressor	5	2 to 5	0
Compressors	Piston compressor	5	2	0
	Centrifugal compressor	10	10	0
	Hydraulic pump	5	2	0
Dumana	Centrifugal pump (start time <10sec)	5	5 to 10	10
Pumps	Centrifugal pump (start time >10sec)	10	10 to 20	15
	Piston pump	10	5 to 10	0
	Centrifugal fan (<0.5m diameter)	10	5 to 10	0
Fans	Centrifugal fan (>0.5m diameter)	20	15 to 20	0
	Vacuum blowers	10	5 to 10	0
Feeders	Screw feeder	10	2 to 10	0
reeders	Auger	10	5 to 10	0
	Agitators	10	5 to 15	0
	Mixers	10	5 to 10	0
	Saws (<0.5 m diameter)	10	5 to 10	5
Rotating machinery	Saws (>0.5 m diameter)	20	15 to 20	10
	Grinder	20	15 to 20	0
	Crusher	30	20	0
	Conveyors	10	5 to 10	5

Note: when using the RSGT on high inertia loads (Trip Class 20, 30) ensure that enough time is left between starts to allow the RSGT to

For Trip Class 20 and Class 30 applications we recommend the use of an external overload protection due to the higher FLC setting that is required on RSGT. The FLC setting for Class 20 and Class 30 applications needs to be set to a higher value with respect to the motor FLC in order not to trip the electronic motor overload protection available on the RSGT soft starters.



Selection guide (220 - 400 VAC)

Motor	Motor HF	ratings	Motor kV	V ratings	Trip class	Trip class	Trip class	Trip Class
FLC [A]	@ 230 V	@ 400 V	@ 230 V	@ 400 V	5	10	20	30
1.8	1/3	1	0.25	0.75	RSGT4012	RSGT4012	RSGT4012	RSGT4012
2.6	1/2	1.5	0.37	1.1	RSGT4012	RSGT4012	RSGT4012	RSGT4012
3.4	3/4	2	0.56	1.5	RSGT4012	RSGT4012	RSGT4012	RSGT4012
5	1.5	3	1.1	2.2	RSGT4012	RSGT4012	RSGT4012	RSGT4012
6	1.5	4	1.1	3	RSGT4012	RSGT4012	RSGT4012	RSGT4012
9	2	5.5	1.5	4	RSGT4012	RSGT4012	RSGT4016	RSGT4025
12	4	7.5	3	5.5	RSGT4012	RSGT4012	RSGT4025	RSGT4025
16	5.5	10	4	7.5	RSGT4016	RSGT4016	RSGT4032	RSGT4045
22	7.5	15	5.5	11	RSGT4025	RSGT4025	RSGT4045	RSGT4045
30	10	20	7.5	15	RSGT4032	RSGT4032	RSGT4055	RSGT4070
37	10	25	7.5	18	RSGT4045	RSGT4045	RSGT4090	RSGT4090
45	15	30	11	22	RSGT4045	RSGT4045	RSGT4090	RSGT4090
55	20	40	15	30	RSGT4055	RSGT4055	RSGT4090	RSGT4090
70	25	50	18	37	RSGT4070	RSGT4070	- *	- *
85	30	60	22	45	RSGT4090	RSGT4090	- *	_ *

- * Contact Carlo Gavazzi representative for further information.
- Option "E0": 110 400 VAC or option "F0": 24 VAC/DC.

Selection guide (480 - 600 VAC)

Motor	Motor H	P ratings	Motor kV	V ratings	Trip class	Trip class	Trip class	Trip class
FLC [A]	@ 480V	@ 600V	@ 480V	@ 600V	5	10	20	30
1.6	3/4	1	0.56	0.75	RSGT6012	RSGT6012	RSGT6012	RSGT6012
2.4	1	1.5	0.75	1.1	RSGT6012	RSGT6012	RSGT6012	RSGT6012
3	1.5	2	1.1	1.5	RSGT6012	RSGT6012	RSGT6012	RSGT6012
3.9	2	3	1.5	2.2	RSGT6012	RSGT6012	RSGT6012	RSGT6012
5	3	4	2.2	3	RSGT6012	RSGT6012	RSGT6012	RSGT6012
6	3	5	2.2	3.7	RSGT6012	RSGT6012	RSGT6012	RSGT6012
9	5	7.5	3.7	5.5	RSGT6012	RSGT6012	RSGT6012	RSGT6012
11	7.5	10	5.5	7.5	RSGT6012	RSGT6012	RSGT6016	RSGT6025
16	10	15	7.5	11	RSGT6016	RSGT6016	RSGT6032	RSGT6032
22	15	20	11	15	RSGT6025	RSGT6025	RSGT6045	RSGT6045
27	20	25	15	18	RSGT6032	RSGT6032	RSGT6055	RSGT6055
32	20	30	15	22	RSGT6032	RSGT6032	RSGT6070	RSGT6070
41	30	40	22	30	RSGT6045	RSGT6045	RSGT6070	RSGT6070
52	40	50	30	37	RSGT6055	RSGT6055	RSGT6090	- *
70	50	60	37	45	RSGT6070	RSGT6070	- *	- *
85	60	75	45	55	RSGT6090	RSGT6090	- *	- *

- * Contact Carlo Gavazzi representative for further information.
- Option "GG": 100 240 VAC or option "FF": 24 VAC/DC.

Caution: the actual motor Amps may be higher or lower than the average values listed above. We suggest to use the actual motor current as listed on the motor nameplate. Use this table as a guide only.

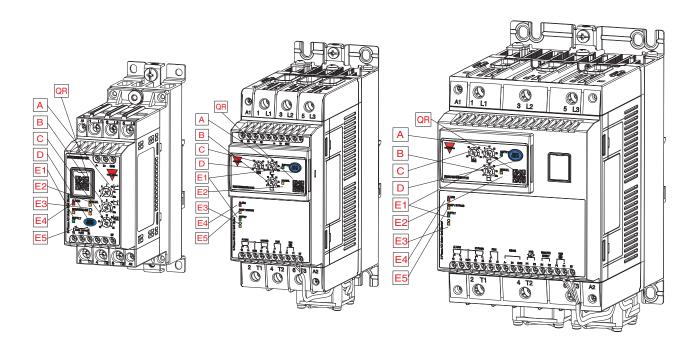


Carlo Gavazzi compatible components

Purpose	Component name/code	Notes
PC interface cable (Isolated USB to TTL cable)	RS-USB	For RSGT12V10 to RSGT25V10
Finger guards	RFCGX6	6 pcs per box
Cooling fan	RFAN-75-40 12 X1	For RSGT 75/120mm models only Rated voltage: 12 VDC
		Power consumption: 0.6 W



Structure



Element	Component	Function		
Α	Ramp-up time selector	Sets the desired motor starting time.		
В	Ramp-down time selector Sets the desired motor stopping time.			
С	FLC selector	Sets the motor full load current (FLC). The FLC setting is used by the RSGT for the overload protection and for the maximum current allowed during motor start.		
D	Test/Reset	Simulate overload alarm (press for 1 sec when RSGT is in Idle state) * The alarm recovery mode needs to be set to manual Set Manual/Automatic alarm recovery mode (press for 5 sec when RSGT is in Idle state) Reset alarms (press for <1sec when the RSGT is in alarm mode and alarm recovery mode is manual) Enable/disable phase sequence protection (press for 10 sec when RSGT is in Idle state) Enable/disable dry run function (press for 3 sec when RSGT is in Idle state) Enable/disable overload function (press for 8 sec when RSGT is in Idle state) Note: While the Test/Reset button is pressed the LED E5 will start flashing with a frequency of 1 Hz (1/sec) in order to help the user count the number of seconds elapsed.		
E1	LED indicators	Supply. Indicates that the RSGT supply is ON.		
E2	LED indicators	Manual. Indicates the alarm reset mode. Manual reset mode - LED ON, Auto reset mode - LED OFF (Factory default setting: Auto, LED OFF)		
E3	LED indicators	Phase sequence. Indicates if the wrong phase sequence protection is enabled (LED OF) or disabled (LED ON). (Factory default setting: Enabled, LED OFF)		
E4	LED indicators	Alarm. Indicates that the RSGT is in alarm. The number of flashes indicates the alarm type.		
E5	LED indicators	Ramping/bypass. Indicates whether RSGT is in ramping (flashing) or bypass (fully ON). Note: Ramping (no HP): 2 Hz flashing. Ramping (with HP): 10 Hz flashing.		
QR	QR code	Scan to link to troubleshooting guide.		



Mode of operation

The RSGT series of soft starters works on two distinct self-learning algorithms depending on the ramp-up time settings.

Ramp-up	Mode of operation
1 or 2 seconds	 When the ramp-up selector is in position 1 or 2, the RSGT will follow a self-learning current limit algorithm. As soon as A1-A2 (or ST for RSGT60 models) control voltage signal is applied, the RSGT will start to ramp-up the motor. At the very first start the current limit will be 4 x FLC setting. In the subsequent starts, the RSGT will automatically adjust the current limit setting to maintain the motor start time as close as possible to the ramp-up time setting.
≥ 5 seconds	 When the ramp-up selector is in position 5 or above, the RSGT will follow a self-learning current ramp algorithm. The RSGT will start with a set of default parameters for starting torque. Depending on the ramp-up time setting, the RSGT will apply a current ramp algorithm to start the motor as close as possible to the set ramp-up time. During the motor start, the current will be limited to a maximum of 3.5 x FLC setting. In the subsequent starts, the RSGT will continue to adjust the starting parameters of initial torque and current ramp to ensure that the motor is started as close as possible to the set ramp-up time.
HP mode of operation	 During the ramp-up sequence, the RSGT will check if the motor is rotating. If the RSGT detects that the motor is in locked rotor condition as soon as control is applied and/or the motor has not reached full speed at the set ramp-up time, it will trigger the HP function. This mode of operation is indicated via a faster flashing sequence on the ramping/bypass LED (E5). The maximum starting current during HP mode can reach: 4 x le for ramp-up setting of 1 or 2 seconds and 3.5 x le for ramp-up setting ≥ 5 seconds. The RSGT will then go in bypass state as soon as it detects that the motor reached full speed.

Ramp-down	Mode of operation
1 to 20 seconds	• During ramp-down, the RSGT works on a torque control algorithm for smoother stopping of the motor.
(for RSGT 45mm)	 As soon as the control voltage signal A1-A2 (or ST for RSGT 60 models) is removed, the RSGT will slow down the motor gradually according to the ramp-down setting.
1 to 30 seconds (for RSGT 75/120mm)	 The power semiconductors will be switched OFF as soon as the time (as per ramp-down setting) has elapsed unless there is a risk of exceeding the maximum temperature on the semiconductors. In such a case the RSGT will leave the motor to coast to stop.
0 seconds	• If the ramp-down selector is set to 0, the RSGT will leave the motor to coast to stop (no ramp-down).

Settings

	RSGT 45mm	RSGT 75mm	RSGT 120mm		
Ramp-up time	1 - 20 s	1 - 30 s	1 - 30 s		
Ramp-down time	0 - 20 s	0 - 30 s	0 - 30 s		
Initial torque	Automatically determined by RSGT				
FLC range settings	RSGT 12: 2 - 12 A RSGT 16: 6 - 16 A RSGT 25: 12 - 25 A	RSGT 32: 20 - 32 A RSGT 45: 32 - 45 A RSGT 55: 25 - 55 A	RSGT 70: 40 - 70 A RSGT 90: 60 - 90 A		



Features

General

	RSGT 45 mm	RSGT 75 mm	RSGT 120 mm
Material		PA66	
Assembly	DIN or panel		
Protection grade	IP20		
Weight	0.5 to 0.75 kg	2.3 kg (approx.)	3.5 kg (approx.)
Overvoltage category	Cat. III		

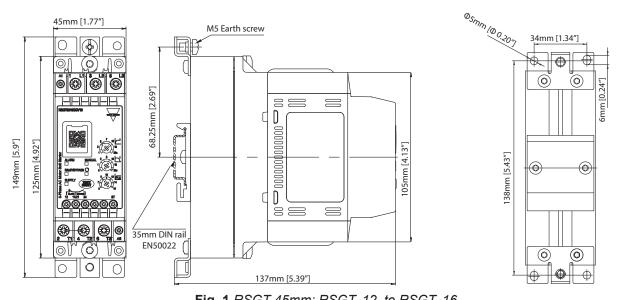


Fig. 1 RSGT 45mm: RSGT..12..to RSGT..16..



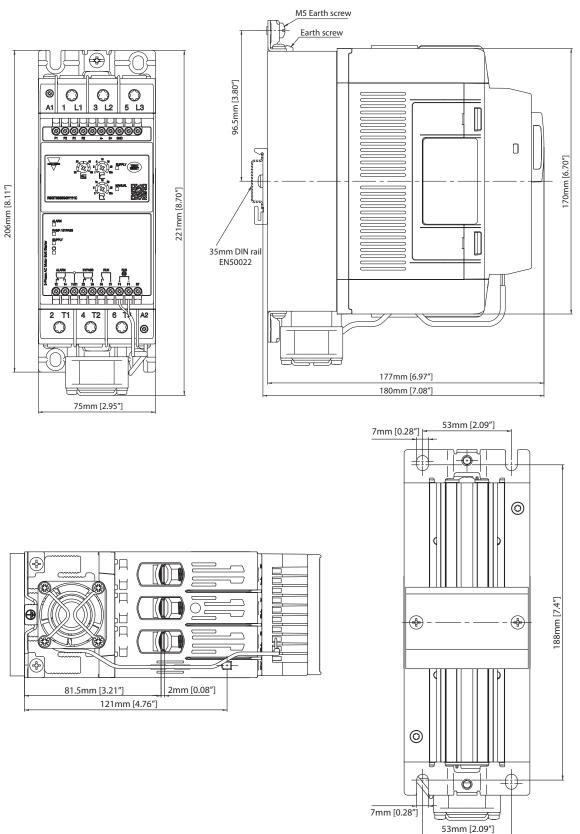


Fig. 2 RSGT 75mm: RSGT..32.. to RSGT..55



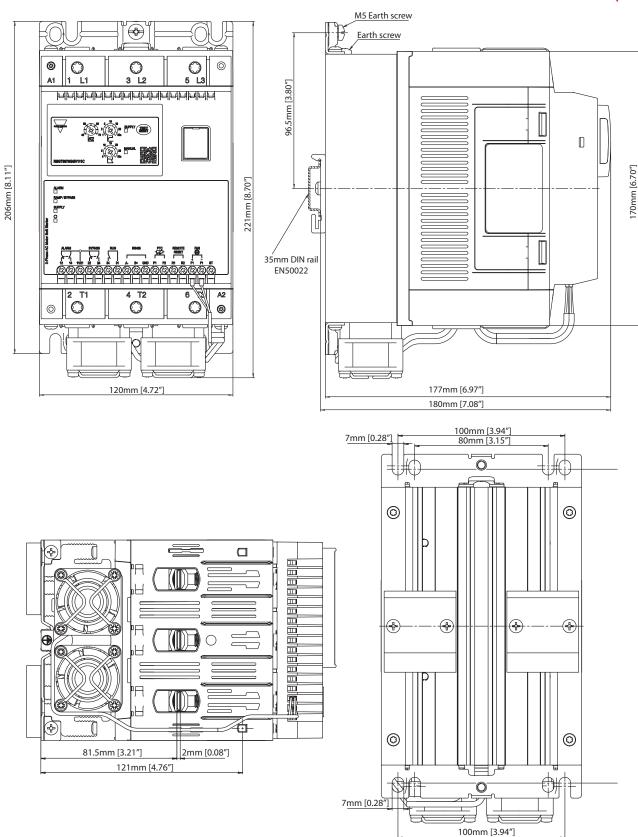


Fig. 3 RSGT 120mm: RSGT..70.. to RSGT..90



Power Supply

	RSGT40	RSGT60
Operational voltage range	187 - 440 VACrms	187 - 660 VACrms
Supply current at Idle	< 30 r	nArms
Blocking voltage	1200 Vp	1600 Vp
Rated AC frequency	50/60 Hz (+/- 10%)	
Rated insulation voltage	600 VAC	690 VAC
Dielectric withstand voltage: Supply to input Supply to heatsink		Vrms Vrms
Integrated varistor	Yes	

Inputs

	RSGT40E0V	RSGT40F0V	RSGT60FFV	RSGT60GGV
Control voltage (Uc)	A1 - A2: 110 - 400 VAC +10%, -15%	A1 - A2: 24 VAC/VDC +10%, -10%	ST: 24 VAC/VDC +10%, -15%	ST: 100 - 240 VAC +10%, -15%
Control voltage range (Uc)	93.5 - 440 VAC	21.6 - 26.4 VAC/DC	21.6 - 26.4 VAC/DC	85 - 264 VAC
Maximum pick-up voltage	80 VAC	20.4 VAC/DC	20.4 VAC/DC	80 VAC
Minimum drop out voltage	20 VAC	5 VAC/DC	5 VAC/DC	20 VAC
Supply voltage range (Us)	-	-	A1 - A2: 24 VAC/DC +10%, -10%	A1 - A2: 100 - 240 VAC +10%, -15%
Rated AC frequency	45 - 66 Hz 45 - 66 Hz (applies to 24 VAC			45 - 66 Hz
Rated insulation voltage (Ui)	500 VAC			
Dielectric strength: Dielectric withstand voltage Rated impulse withstand voltage	2 kVrms 4 kVrms			
Control input current	0.55 - 1.3 mArms	0.4 - 1 mArms	0.5 - 1.5 mArms	0.4 - 3 mArms
Input to output response time (Mains supply already present)	200 ms			
Input to output response time (Mains supply applied with control)	2 sec 3 sec		sec	
Integrated varistor	Yes			

Note 1: for the Canadian application, the control terminals A1, A2 (or A1, A2, ST for RSGT60 versions) of the RSGT devices shall be supplied by a secondary circuit where power is limited by a transformer, rectifier, voltage divider, or similar device that derives power from a primary circuit, and where the short-circuit limit between conductors of the secondary circuit or between conductors and ground is 1500VA or less. The short-circuit volt ampere limit is the product of the open circuit voltage and the short circuit ampere.

Note 2: RSGT60GG soft starters require a separate 100 - 240V, 50/60 Hz single phase control source, while RSGT60FF requires 21.6 - 26.4 VAC/DC. Output connections (L1, L2, L3, T1, T2, T3) are not galvanically isolated from the external supply connections (A1, A2, ST).



Outputs

	RSGT12	RSGT16	RSGT25
Overload cycle @ 40°C surrounding temperature (acc. to EN/IEC 60947-4-2)	AC53b: 3 - 12 : 288		
Maximum number of starts/hr @ rated overload cycle @ 40°C surrounding temperature	12		
Rated operational current @ 40°C	12 Arms	16 Arms	25 Arms
Rated operational current @ 50°C	12 Arms	15 Arms	23 Arms
Rated operational current @ 60°C	12 Arms	13 Arms	21 Arms
Minimum load current	1 Arms		

	RSGT32	RSGT45	RSGT55
Overload cycle @ 40°C surrounding temperature (acc. to EN/IEC 60947-4-2)	AC53b: 3 - 12 : 288		
Maximum number of starts/hr @ rated overload cycle @ 40°C surrounding temperature	12		
Rated operational current @ 40°C	32 Arms	45 Arms	55 Arms
Rated operational current @ 50°C	29 Arms	41 Arms	50 Arms
Rated operational current @ 60°C	27 Arms	37 Arms	46 Arms
Minimum load current	5 Arms		

	RSGT70	RSGT90
Overload cycle @ 40°C surrounding temperature (acc. to EN/IEC 60947-4-2)	AC53b: 3 - 12 : 288	
Maximum number of starts/hr @ rated overload cycle @ 40°C surrounding temperature	12	
Rated operational current @ 40°C	70 Arms	90 Arms
Rated operational current @ 50°C	64 Arms	83 Arms
Rated operational current @ 60°C	59 Arms 76 Arms	
Minimum load current	5 Arms	

Note: the overload cycle describes the switching capability of the soft starter at a surrounding temperature of 40°C as described in EN/ IEC 60947-4-2. An overload cycle AC53b:3-12:348 means that the soft starter can handle a starting current of 3x le for 12 seconds followed by an OFF time of 348 seconds.



Auxiliary relays

	RSGT 45mm	RSGT 75mm	RSGT 120mm	
Number of output relays	2	(3	
Function of relays	Alarm, Bypassed (top of ramp).	Alarm, Bypassed (top of ramp), Run		
Rated operational voltage		250 VAC/30 VDC		
Rated insulation voltage		250 VAC		
Dielectric withstand voltage		2.5 kV		
Overvoltage category	II			
Type of control circuit	Electromechanical relay			
Number of contacts	Alarm: 1 Bypassed: 1	Alarm: 2 Bypassed: 2 Run: 1		
Type of contacts	Alarm: normally closed (NC) Bypassed: normally open (NO)	Bypassed: Changeover (NO, NC)		
Type of current	AC / DC			
Rated operational current	3 Arms @ 250 VAC, 3 Arms @ 30 VDC		VDC	

RS485

Туре	Bi-directional (static and dynamic variables and parameters)
Functions	Configuration of device Start/Stop Modification of set-point parameters Monitoring of measured variables
Connection	2-wires Note: to reduce the noise use a shielded cable and connect the shield to GND terminal and to the ground at the same point.
Address	Default : 1 Selectable via software: range 1 - 247
Protocol	MODBUS (RTU)
Factory defined data format	Data bits: 8 Parity: none Stop bit: 1 Selectable via software: parity: none (2 stop bits), odd (1 stop bit), even (1 stop bit)
Baud rate	Default: 9.6k bits/s Selectable via software: 9.6k, 19.2k, 38.4k bits/s

Note: applies to RSGT...V.C models only



Environmental

Working temperature	-20°C to +60°C (-4°F to +140°F). Note: for temperatures > 40°C derating applies.
Storage temperature	-40°C to +80°C (-40°F to +176°F).
Relative humidity	< 95% non-condensing @ 40°C.
Pollution degree	2
Installation category	III
Installation altitude	1000 m
Vibration Frequency 1 Frequency 2	Acc. to IEC/EN 60068-2-6 2 [+3/-0] Hz to 25 Hz displacement +/- 1.6 mm 10 Hz to 55 Hz @ 2g (19.96m/s²) @ constant displacement

Compatibility and conformity

Approvals	CE LISTED EHL CA
	RSGT 45 mm
Standards compliance	LVD: EN 60947-4-2:2012 EE: EN 60947-4-2:2012 EMCD: EN 60947-4-2:2012 EMC: EN 60947-4-2:2012 UL: UL 60947-4-2, E172877, NMFT cUL: C22.2 no. CSA C22.2 no. 60947-4-2, E172877, NMFT7
Standards compilance	RSGT 75 mm / RSGT 120 mm
	LVD: EN 60947-4-2:2012 EE: EN 60947-4-2:2012 EMCD: EN 60947-4-2:2012 EMC: EN 60947-4-2:2012 UL: E172877, NMFT, UL508 cUL: C22.2 no. CSA C22.2 no. 14, E172877, NMFT7



Electromagnetic compatibility (EMC) - immunity			
	RSGT 45 mm	RSGT 75 mm	RSGT 120 mm
Electrostatic discharge (ESD)			
EN/IEC 61000-4-2	PC1	PC2	PC2
8 kV air discharge, 4 kV contact			
Radiated radio frequency			
EN/IEC 61000-4-3			
10 V/m, from 80 MHz to 1 GHz		PC1	
10 V/m, from 1.4 to 2 GHz		PC1	
3 V/m, from 2 to 2.7 GHz		PC1	
Electrical fast transient (burst)			
EN/IEC 61000-4-4			
AC input: 2 kV, 5 kHz & 100 kHz	PC1	PC2	PC2
DC input: 1 kV, 5 kHz & 100 kHz	PC2	PC2	PC2
Signal: 1 kV, 5 kHz & 100 kHz	PC2	PC2	PC2
Control: 2 kV, 5 kHz &100 kHz	PC2	PC2	PC2
Output: 2 kV, 5 kHz & 100 kHz	PC2	PC1	PC2
Conducted radio frequency			
EN/IEC 61000-4-6		PC2	
10 V/m, from 0.15 to 80 MHz			_
Electrical surge, EN/IEC 61000-4-5			
Output, line to line: 1 kV	PC2	PC2	PC2
Output, line to earth: 2 kV	PC1	PC2	PC2
AC input, line to line: 1 kV	PC1	PC1	PC1
AC input, line to earth: 2 kV	PC1	PC1	PC1
DC input, line to line: 1 kV	PC2	PC2	PC2
DC input, line to earth: 2 kV	PC2	PC2	PC2
Signal and control, line to earth: 2 kV	PC1	1 kV (PC2)	1 kV (PC2)
Voltage dips, EN/IEC 61000-4-11			
0% for 10 ms and 20 ms	PC2		
40% for 100, 200, 1000 ms		PC2	
70% for 500 ms		PC2	
80% for 5000 ms	PC2		
0% for 5000 ms	PC2		

Electromagnetic compatibility (EMC) - emissions		
Radio interference field emis-	EN/IEC 55011	
sion (radiated)	Class A (Industrial): from 30 to 1000 MHz	
Radio interference voltage	EN/IEC 55011	
emissions (conducted)	Class A (Industrial): from 0.15 to 30 MHz	



Performance



Current / power ratings: kW and HP @ 40°C

Model	IEC Rated Current	220 - 240 VAC	380 - 415 VAC	440 - 480 VAC	550 - 600 VAC
RSGT12	12 Arms	3 kW / 3 HP	5.5 kW / 5 HP	5.5 kW / 7.5 HP	9 kW / 10 HP
RSGT16	16 Arms	4 kW / 5 HP	7.5 kW / 7.5 HP	9 kW / 10 HP	11 kW / 15 HP
RSGT25	25 Arms	5.5 kW / 7.5 HP	11 kW / 10 HP	11 kW / 15 HP	20 kW / 20 HP
RSGT32	32 Arms	9 kW / 10 HP	15 kW / 15 HP	18.5 kW / 20 HP	22 kW/ 30 HP
RSGT45	45 Arms	11 kW / 15 HP	22 kW/ 25 HP	22 kW/ 30 HP	37 kW/ 40 HP
RSGT55	55 Arms	15 kW / 20 HP	30 kW / 30 HP	30 kW / 40 HP	45 kW / 50 HP
RSGT70	70 Arms	20 kW / 25 HP	37 kW / 40 HP	45 kW / 50 HP	55 kW / 60 HP
RSGT90	90 Arms	22 kW / 30 HP	45 kW / 50 HP	45 kW / 60 HP	55 kW / 75 HP

Ratings:

kW rating according to: IEC/EN 60947-4-2



Starts per hour

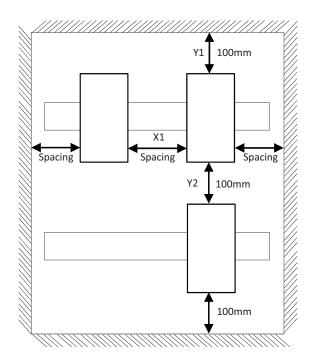
The table below indicates the maximum number of starts/hr that can be done by the different RSGT models at different operating currents with a surrounding temperature of 40°C.

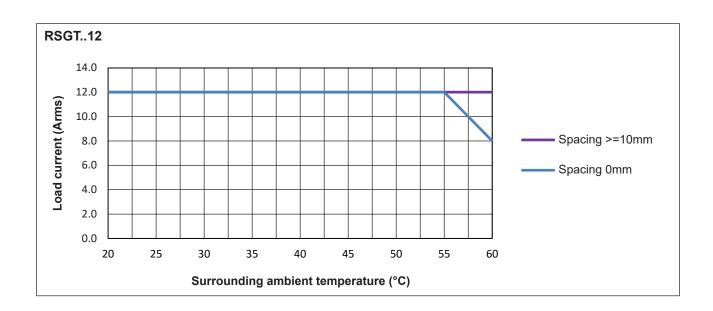
Model	Operational current					
wodei	6 Arms	12 Arms	16 Arms	25 Arms		
RSGT12.	26	12	-	-		
RSGT16.	37	17	12	-		
RSGT25.	64	29	21	12		

Model	Operational current							
wodei	12 Arms	16 Arms	25 Arms	32 Arms	45 Arms	55 Arms	70 Arms	90 Arms
RSGT32.	36	26	12	-	-	-	-	-
RSGT45.	55	40	24	18	12	-	-	-
RSGT55.	75	54	32	24	16	12	-	-
RSGT70	90	66	41	31	21	16	12	-
RSGT90	121	89	55	42	28	22	17	12

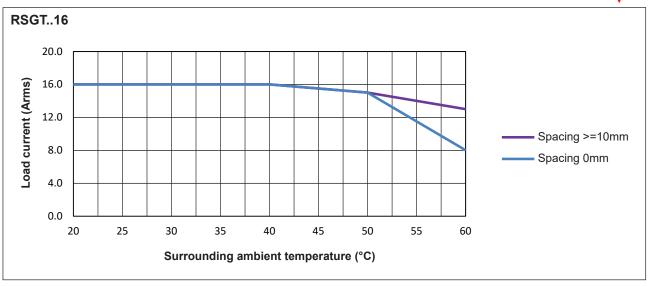


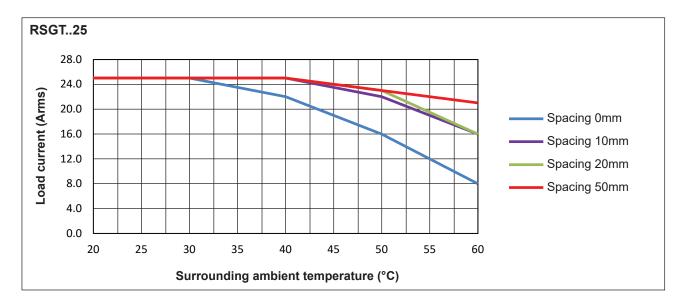
Current derating curves

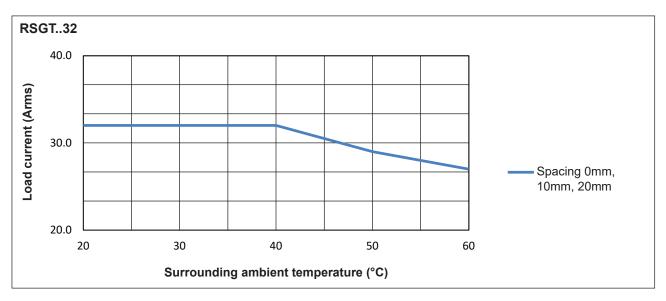




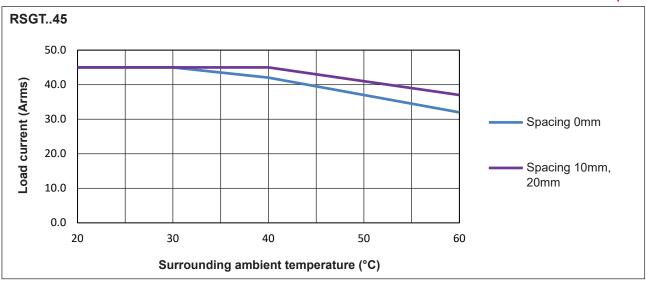


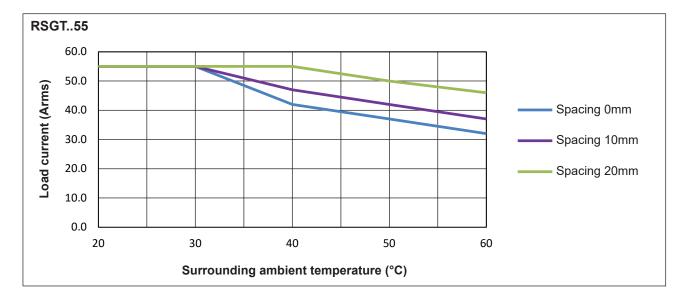


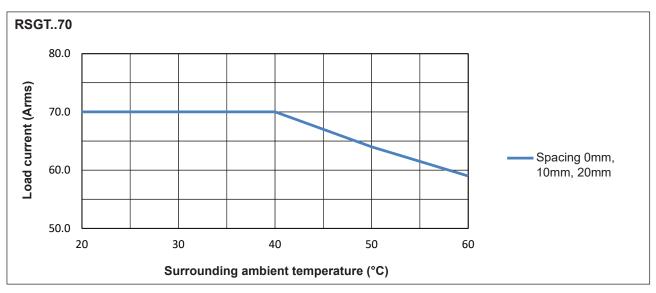




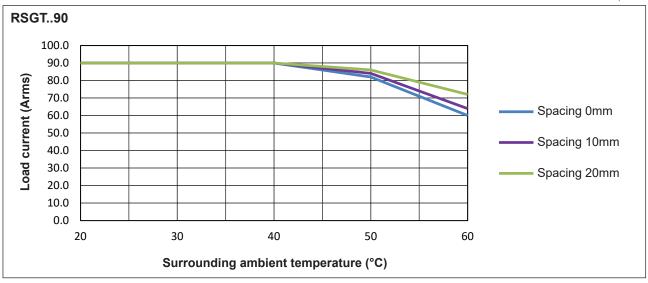










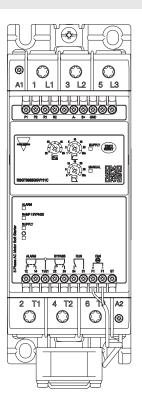




Connection Diagrams

Terminal markings





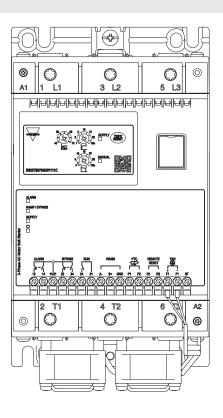


Fig. 4 RSGT 45mm...

Fig. 5 RSGT 75mm...

Fig. 6 RSGT 120mm...

	RSGT	45 mm	RSGT	75mm	RSGT 120mm	
Marking	RSGT40	RSGT60	RSGT40	RSGT60	RSGT40	RSGT60
1 L1, 3 L2, 5 L3			Line con	nections		
2 T1, 4 T2, 6 T3			Load cor	nections		
A1, A2	Control voltage	Supply voltage	Control voltage	Supply voltage	Control voltage	Supply voltage
ST	-	Control voltage	-	Control voltage	-	
11, 12	Alarm indication (normally closed, NC)					
21, 22	-		Top of ramp indication (normally closed, NC)			, NC)
21, 24		Тор	of ramp indicatior	n (normally open,	NO)	
31, 34		-		Run relay (norn	nally open, NO)	
R1, R2		-		Remote res	et of alarms	
P1, P2		-		PTC	input	
A-, B+, GND	Modbus connections **					
F1+, F1- *	-		Fan connection			
Note:			4 VDC (RSGT40. he positive (+) ar			



Wiring diagrams

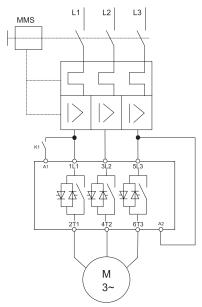
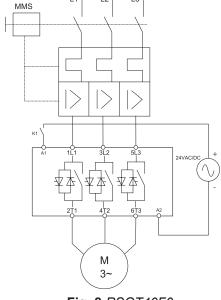


Fig. 7 RSGT40E0...



L2

Fig. 8 RSGT40F0...

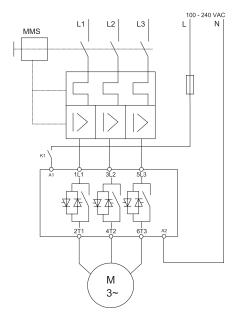


Fig. 9 RSGT40E0...

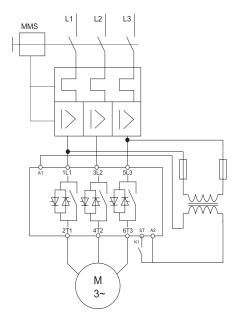


Fig. 10 RSGT60. GG models: Apply 100 - 240VAC, FF models: Apply 24VAC/DC

^{*}Note: It is recommended that the power factor correction capacitors be switched out of the circuit during the ramp-up phase. When the RSGT is in the bypass state (bypass relays closed), the capacitor may be switched back into the circuit. Capacitors may affect the proper operation of the silicon controlled rectifiers (SCRs) if kept in the circuit during the start ramp.



Connection specifications

Line conductors 1 L1, 3 L2, 5 L3, 2 T1, 4 T2, 6 T3 Acc. to EN60947-1					
RSGT 45mm RSGT 75 mm RSGT 120 m					
Flexible	2.5 - 10 mm ² 2.5 - 2 x 4 mm ²				
Rigid (solid or stranded)	2.5 - 10 mm ²	2 x (10 -	50 mm ²⁾		
Flexible with end sleeve (ferrule)	2.5 - 10 mm²	2 x (10 - 50 mm ²⁾			
UL/cUL rated data Rigid (stranded) Rigid (solid) Rigid (solid or stranded)	AWG 6 -14 AWG 10 -14 2 x (AWG 10 - 14)	2 x (AWG 8 - 10)			
Terminal screws	M4	M8			
Maximum tightening torque	2.5 Nm (22 lb.in) with pozidriv bit 2	12 Nm (106 lb.in) with Torx TT40 bit			
Stripping length	8.0 mm	20 r	nm		

Secondary conductors A1, A2 Acc. to EN60998					
	RSGT 45mm	RSGT 75 mm	RSGT 120 mm		
Flexible	0.5 1.5 mm²				
Rigid (solid or stranded)	0.5 2.5 mm²				
Flexible with end sleeve (ferrule)	0.5 1.5 mm²				
UL/cUL rated data Rigid (solid or stranded)	AWG 1018				
Terminal screws	M3				
Maximum tightening torque	0.6 Nm (5.3 lb.in) with pozidriv bit 1				
Stripping length		6.0 mm			

Auxiliary conductors 11, 12, 21, 22, 24, ST, A- , B+, GND, P1, P2, R1, R2, F1+, F1-					
	RSGT 45mm	RSGT 75 mm	RSGT 120 mm		
Rigid (solid or stranded)	0.5 2.5 mm²				
Flexible with end sleeve (ferrule)	0.05 1.5 mm²				
UL/cUL rated data Rigid (solid or stranded)	AWG 30 14				
Terminal screws	M3				
Maximum tightening torque	0.45 Nm (4.0 lb.in) pozidriv bit 1				
Stripping length		6.0 mm			

Use 75°C Copper (Cu) conductors



Troubleshooting

LED status indications

State	Supply (green LED)	Ramp/Bypass (yellow LED)	Alarm (red LED)	Manual (yellow LED)
Idle	ON	OFF	OFF	OFF/ON
Ramping	ON	Flashing	OFF	OFF/ON
Bypass	ON	ON	OFF	OFF/ON
Alarm (Auto-recovery)	ON	OFF	Flashing	OFF
Alarm (Manual recovery)	ON	OFF	Flashing	ON
Internal fault	ON	OFF	ON	OFF/ON
Idle (Start to start or stop to start time not elapsed)	Flashing	OFF	OFF	OFF/ON

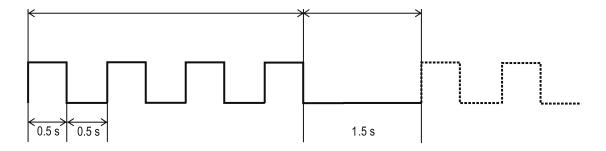


Relay status indication

		Relay contact position					
State	Supply	RSGT	45mm	RSGT	20 mm		
State	(green LED)	Alarm (11, 12)	Bypass (21, 24)	Alarm (11, 12, 14)	Bypass (21, 22, 24)	Run (31, 34)	
Idle	ON	Closed	Open	11, 12	21, 22	Open	
Ramping	ON	Closed	Open	11, 12	21, 22	Closed	
Bypass	ON	Closed	Closed	11, 12	21, 24	Closed	
Alarm (Auto-recovery)	ON	Open	Open	11, 14	21, 22	Open	
Alarm (Manual recovery)	ON	Open	Open	11, 14	21, 22	Open	
Internal fault	ON	Open	Open	11, 14	21, 22	Open	
Idle (Start to start or stop to start time not elapsed)	Flashing	Closed	Open	11, 12	21, 22	Open	

Alarms

The RSGT includes a number of diagnostics and protection features each of which is signalled through a flashing sequence on the red LED.





Number of flashes	2
Alarm	Wrong phase sequence
Alarm description	If the connection to the soft starter is not done in the correct sequence (L1, L2, L3), the RSGT will trigger the wrong phase sequence alarm and the motor will not be started.
Alarm recovery period	N/A
Consecutive alarms for hard reset	1
Action to recover alarm	User intervention is required to change the wiring sequence to recover alarm. Note: the phase sequence monitoring can be disabled. To disable the alarm, refer to the "Structure" section ATTENTION: in this mode, if the wiring is not in the correct sequence, the motor will rotate in the reverse direction.
Troubleshooting	 Check that wiring on L1, L2, L3 is in the correct sequence. If you need to reverse the motor, make sure that the phase sequence LED is ON (phase sequence protection disabled).

Number of flashes	3
Alarm	Line voltage out of range
Alarm description	At every power-up the RSGT automatically detects the supply voltage level and determines whether it is working on a 220, 400, 480* or 600* V supply. The under- or over- voltage alarm level is then set at a level of -20% and + 20% (from the measured supply voltage level) respectively. If the supply voltage level is out of these limits for more than 5 seconds then the line voltage out of range alarm will be triggered. * Applies to RSGT60 models. Note: for RSGT60 over-voltage alarm level (for the case of a 600V supply) is 675V (600V + 12.5%).
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	5
Action to recover alarm	The alarm will self-recover (in auto-recovery mode) after 5 minutes from when the supply voltage is within limits. (If manual reset mode is applied, alarm can be cleared as instructed in the "Structure" section).
Troubleshooting	 Check supply voltage level across L1, L2, L3 terminals. Make sure that you are not using a RSGT40 model on a supply voltage > 440 VAC.

Number of flashes	4
Alarm	Phase loss (motor side)
Alarm description	If any of the phases on the load (motor) side becomes open the RSGT will trip after 5 seconds to protect the motor from running/ starting on 2 phases. Note: this alarm will also be triggered when a current unbalance of > 20% is detected on any of the three line currents for a minimum of 5 secs. Additionally if a SCR and/or bypass relay is open (damaged) the same alarm will be triggered.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	5
Action to recover alarm	Check connections on the output side of the soft starter and on the motor terminals. The alarm will self-recover (in Auto-recovery mode) after 5 minutes. (If manual reset mode is applied, alarm can be cleared as instructed in the "Structure" section).
Troubleshooting	 Check for any loose connections on the T1, T2, T3 side of the soft starter. Check for any loose connections on the motor terminals. Check motor windings.



Number of flashes	5	
Alarm	Locked rotor	
Alarm description	If a current ≥ 5xFLC setting for 100 msec is detected, the RSGT will issue the locked rotor alarm.	
Alarm recovery period	5 minutes	
Consecutive alarms for hard reset	5	
Action to recover alarm	The alarm will self-recover (in Auto-recovery mode) after 5 minutes. (If manual reset mode is applied, alarm can be cleared as instructed in the "Structure" section).	
Troubleshooting	 Check that FLC setting is not smaller than motor name plate current. Check that the RSGT model is suitably rated for the motor. Check motor windings resistance to check if motor is damaged. 	

Number of flashes	6		
Alarm	Dry-run		
Alarm description	If less than 50% of FLC current flows for 5 seconds, dry-run alarm will be triggered.		
Alarm recovery period	5 minutes		
Consecutive alarms for hard reset	5		
Action to recover alarm	The alarm will self-recover (in Auto-recovery mode) after 5 minutes (If manual reset mode is applied, alarm can be cleared as instructed in the "Structure" section).		
Troubleshooting	 Check that the FLC setting is not too much higher than the motor name plate current. Check motor load. 		

Number of flashes	7		
Alarm	Over-temperature		
Alarm description	The RSGT constantly measures the heatsink and thyristors (SCRs) temperature. If the maximum internal temperature is exceeded (for 0.5 sec) an overtemperature alarm is triggered. This condition can be triggered by too many starts per hour, an over-load condition during starting and/or stopping or a high surrounding temperature.		
Alarm recovery period	Depends on the cooling period. The RSGT will only recover if the internal temperature is within safe limits.		
Consecutive alarms for hard reset	I reset 5		
The alarm will self-recover (in Auto-recovery mode) - the recover depend on the cooling time required by RSGT. The higher the temperature, the longer the cooling period. (If manual reset mode is applied, alarm can be cleared as instructure" section).			
Troubleshooting	 Check that the specified number of starts/hr are not exceeded. Check that the surrounding temperature around the soft starter is within limits. 		



	<u> </u>		
Number of flashes	8		
Alarm	Overload		
Alarm description	The overload alarm can be triggered in case of the following conditions: Measured current > 1.05 x FLC during transition from ramp-up to bypass and also during bypass. Load current > FLC. Trip time will vary according to Trip Class 10.		
Alarm recovery period	Depends on the cooling period. To disable class 10 overload protection follow the instructions in the "Structure" section. The RSGT will only recover if the internal temperature is within safe limits.		
Consecutive alarms for hard reset	5		
Action to recover alarm The alarm will recover automatically after (approx.) 5 minutes. (If manual reset mode is applied, alarm can be cleared as ins "Structure" section). Note: allow enough time for the motor to cool before attempting			
Troubleshooting	 Make sure that the FLC setting is according to the current on the moton name plate. Check for any blockages in the load. If overload alarm occurs during ramp-up try to set a shorter ramp-up time of increase the FLC setting. 		

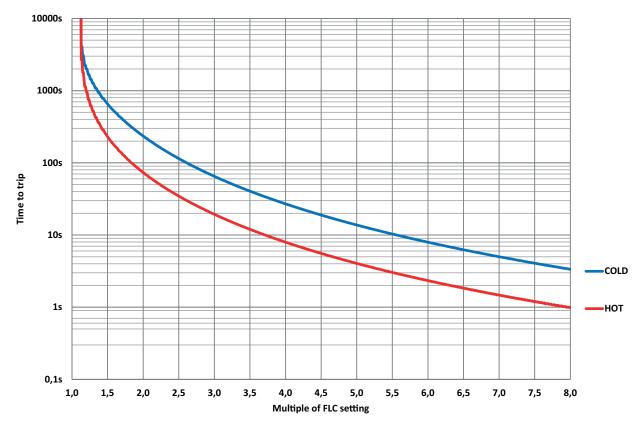


Fig. 11 RSGT Class 10 motor overload trip profile

PTC resistance - P1, P2 connection *			
< 500Ω	No Trip	Normal running	
> 1000Ω	Trip	Overload alarm (8 flashes) & alarm relay activated	
< 300Ω	Reset		



	<u> </u>
Remote reset of alarms (R1, R2)*	To reset alarms via the R1-R2 terminals you need to: Make sure that the alarm reset mode is set to MANUAL (MANUAL LED ON). To set the alarm reset mode to MANUAL press the Test/Reset button for 5 seconds when the RSGT is in IDLE mode. When RSGT is in alarm mode, short the terminals R1, R2 for 1 second. This will clear the alarm and RSGT will go to IDLE state. Note: do not apply voltage on R1, R2 terminals as this might damage the soft starter.

Number of flashes	9		
Alarm	Supply voltage unbalance		
Alarm description	The RSGT measures the voltages on all the three phases and if there is a difference of more than 20% for ≥ 5sec between any of the phases, the RSGT will trigger the voltage unbalance alarm.		
Alarm recovery period	5 minutes		
Consecutive alarms for hard reset	4		
Action to recover alarm	The alarm will recover automatically after 5 minutes. (If manual reset mode is applied, alarm can be cleared as instructed in the "Structure" section).		
Troubleshooting	 Check supply voltage level across L1, L2, L3 terminals. Check connections on the L1, L2, L3 terminals. 		

Number of flashes	10	
Alarm	Shorted thyristor (SCR)	
Alarm description	In case the RSGT detects that there is a damaged (shorted) thyristor (SCR) on any of the three phases, the soft starter will trip.	
Alarm recovery period	-	
Consecutive alarms for hard reset	1	
Action to recover alarm	Note: this alarm is not resettable and it is suggested to replace the unit and contact a Carlo Gavazzi representative should this alarm occur.	
Troubleshooting	 Check resistance across L1-T1 and L3-T3 to check for any short. If any of the SCRs is damaged, replace the soft starter. 	

Number of flashes	Fully ON	
Alarm	Internal fault	
Alarm description	In case there is an internal fault in the RSGT circuitry, the Red LED will remain continuously ON.	
Alarm recovery period	-	
Consecutive alarms for hard reset	1	
Action to recover alarm	Note: this alarm is not resettable and it is suggested to replace the unit and contact a Carlo Gavazzi representative should this alarm occur.	
Troubleshooting	 Check resistance across L1 - T1 and L3 - T3 to check for any short. If any of the SCRs is damaged, replace the soft starter. 	

^{*} Applies to RSGT 75/120 mm models only



Short circuit protection

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 5,000* symmetrical Amperes, 400 or 600 Volts maximum when protected by fuses. Tests at 5,000 A* were performed with Class RK5 fuses, fast acting; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

Note: For fuse size of 600A or less, Class CC, G, H, K, J, RK1 or T fuses can be used instead of RK5 fuses.



Time delay fuses (UL 60947-4-2)

Item No.	Max. fuse size [A]	Current [kA]	Class	Max. voltage [VAC]
RSGT12	15	5		
RSGT16	20			
RSGT25	25		DVE	600
RSGT32	50			
RSGT45	50		RK5	600
RSGT55	60			
RSGT70	100	40		
RSGT90	100	10		



Manual motor starters

Item No.	Model No.	Current [kA]	Max. voltage [VAC]
RSGT12	GMS32H-17	-	400
RSGT16	GMS32H-17		
RSGT25	GMS32H-32		
RSGT32	GMS32H-32	10	
RSGT45	GMS63H-50		
RSGT55	GMS63H-63		
RSGT70	GMS100H-75		
RSGT90	GMS100H-100		

Note: products protected with manual motor starters must be wired with a minimum length of 2.0 m (10.0 m for 12, 16 A models) of Cu wire conductor with a maximum cross-sectional area of 2.5 mm² for 12 Arms and 16 Arms devices, 10 mm² for 25, 32, 45 Arms devices, 16 mm² for 55 Arms devices and 50 mm² for higher currents. The length includes the conductors from the voltage source to the manual motor starter to the soft starter and from the soft starter to the load.



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^{*} For RSGT 70 to RSGT 90 models 10,000 symmetrical Amperes apply.

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RSGT4012E0V10 RSGT4012E0V10C RSGT4012F0V10 RSGT4012F0V10C RSGT4016E0V10

RSGT4016E0V10C RSGT6090FFV111C RSGT6090GGV111C RSGT6045FFV111C RSGT6045GGV111C

RSGT6055FFV111C RSGT6055GGV111C RSGT6070FFV111C RSGT6070GGV111C RSGT6025FFV10

RSGT6025FFV10C RSGT6025GGV10 RSGT6025GGV10C RSGT6032FFV110C RSGT6032GGV110C

RSGT6012GGV10 RSGT6012GGV10C RSGT6016FFV10 RSGT6016FFV10C RSGT6016GGV10

RSGT6016GGV10C RSGT4070E0V111C RSGT4070F0V111C RSGT4090E0V111C RSGT4090F0V111C

RSGT6012FFV10 RSGT6012FFV10C RSGT4032E0V110C RSGT4032F0V110C RSGT4045E0V111C

RSGT4045F0V111C RSGT4055E0V111C RSGT4055F0V111C RSGT4016F0V10 RSGT4016F0V10C

RSGT4025E0V10 RSGT4025E0V10C RSGT4025F0V10 RSGT4025F0V10C