CARLO GAVAZZI
Automation Components

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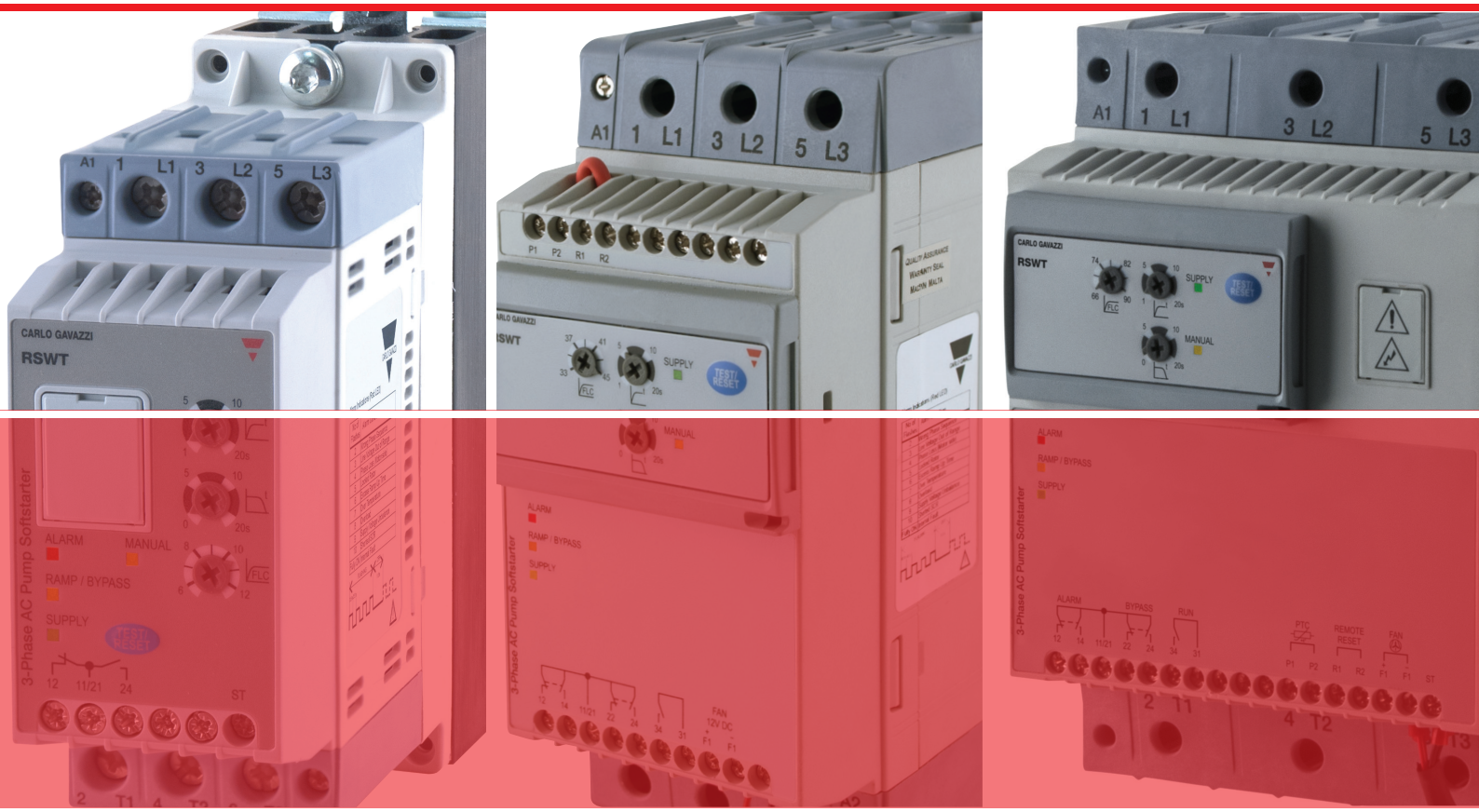


RSWT centrifugal pump soft starter series

Switches

RSWT series
Centrifugal pump soft starters

The global demand for water is expected to see a consistent growth over the next years. As a result of the rising living standard and the growing population across the globe, there is more demand for water facilities and hence pumps. Achieving an optimal control during starting/stopping of a pump can be quite challenging and, unless proper solutions are adopted, a number of undesired effects can be generated such as water hammering, cavitation and voltage disturbances.

Carlo Gavazzi's RSWT series is an intelligent soft starting solution dedicated to centrifugal pumps. The RSWT algorithm is self-learning in order to simplify the user experience and reduce the commissioning time. Additionally, the self-learning function ensures optimal pump starts and stops even under different load conditions.

Self-learning soft starters

An innovative and easy to use solution for centrifugal pumps

- Easy to use
- Self-learning algorithm
- Integrated diagnostic functions
- Trip Class 10 overload protection
- Multi-range operational voltage
- Minimises commissioning time
- More space in the electrical panel
- Increased pump protection

Applications

Agriculture

- Irrigation systems
- Reverse-osmosis
- Water desalination
- Underground water pumping

Smart Building

- Water distribution
- Water pumping
- Water circulation pumps

Food & Beverage

- Food container washers
- High pressure cleaning
- Water cooling pumps
- Industrial dish washing

HVAC

- Circulating water pumps
- Water cooling systems

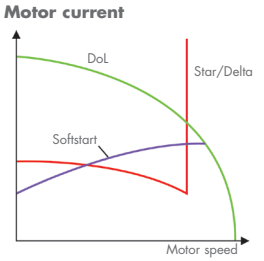
RSWT series
Centrifugal pump soft starters

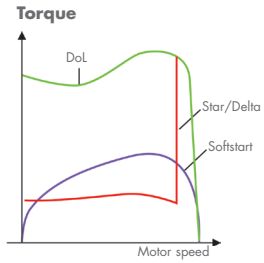
High starting currents with conventional starting methods

Direct on line (DOL) starting causes a high mechanical/torque stresses on the pump shafts and connections as well as considerable electrical disturbance due to the high starting currents.

Star/delta solves the problem of starting partially, but the transition from star to delta may also cause severe torque oscillations that can be higher than with DOL.

In both cases, there is no possibility of any controlled stop so water hammering may be quite significant in particular installations where such methods are used.





Water hammering and cavitation reduce pump lifetime

Water hammering, especially in installations with long pipes, may cause severe damages in pipes, connections as well as valves. This is caused by rapid changes in the liquid flow that in turn cause considerable pressure transients resulting in severe vibrations and audible noise.

Cavitation is another phenomenon that may reduce the lifetime of the pump especially with regards to the pump impeller. A rapid pressure change or a pump that is not porperly sized may result in a pressure difference between the static pressure and the liquid vapour pressure. When this happens, cavitation bubbles are formed and these may start to collapse (implode) on the metal surface with a high impact force which in turns causes material erosion.

What about high efficiency motors?

EU regulation 640/2009 forces manufacturers to comply with specific efficiency classes. As of January 2015, motors in the power range of 7.5kW to 375kW need to have efficiency class IE3 or IE2 supplied with a frequency drive. As of January 2017, this requirement will also apply to motors from 0.75kW to 7.5kW.

Due to their design, starting of high efficiency motors may require up to **15 times** the nominal motor current. This translates into :-

- Higher mechanical stresses on the pump shafts and impellers
- Increased electrical disturbances to the electrical supply network
- More frequent trips of electronic protection devices

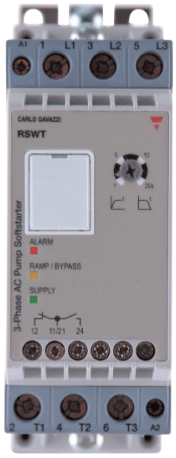
RSWT: Simply innovative

Easy to use

The RSWT..V00/V010/V011 version only requires 1-knob setting for the ramp-up and ramp-down time making this product an ideal replacement to electromechanical contactors or star-delta starters.

The RSWT...V10/V110/V111 versions require just 3 knobs for ramp-up, ramp-down and full load current (FLC) adjustment required for a proper overload protection.

3-knob setting

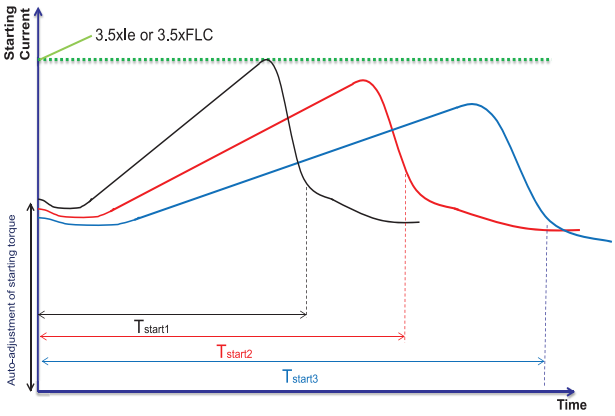


1-knob setting

Self-learning algorithm

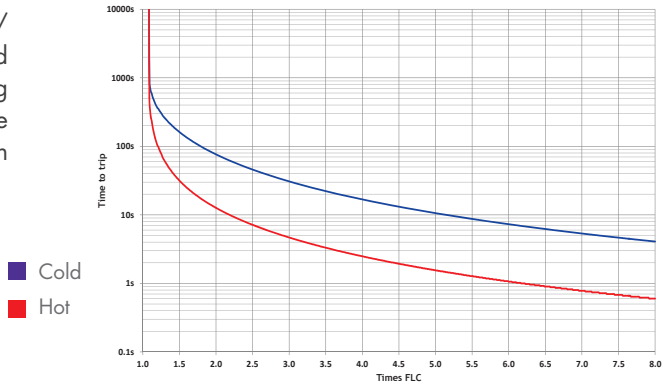
The RSWT work on a self-learning algorithm to optimise the starting and stopping of centrifugal pumps. Within 3 to 6 starts the RSWT reaches optimisation, however the self-learning routine will be active at every start to ensure optimal starting and stopping parmeters are used even if the load changes. This results in less water hammering and reduced risk of cavitation.

RSWT is also 3-phase controlled which means that starting current is maintained at the lowest possible level - typically 2.5 to 3.5 times the motor nominal current. This results is less electrical distrurbances and lower peak demand.



Increased pump protection

Highlighting abnormal conditions is highly important in order to protect pumps from irreversible damage. RSWT...V10/V110/V111 series features a Class 10 electronic overload protection function together with additional monitoring functions such as phase sequence, phase loss and voltage unbalance. All this results in a more cost effective solution whilst saving panel space.



RSWT series
Centrifugal pump soft starters

A comprehensive family of soft starters for centrifugal pumps



	RSWT 45mm	RSWT 75mm	RSWT 120mm
Operational current	12A to 25A	32A to 55A	70A to 90A
Operational voltage	RSWT40: 220 - 400VAC, RSWT60: 220 - 600VAC		
Motor power @ 400 VAC	5.5kW to 11kW (15HP to 10HP)	15kW to 30kW (15HP to 30HP)	37kW to 45kW (40HP to 50HP)
Maximum starts per hour @ 40ºC	20		
User interface	V00: 1-knob V10: 3-knobs	V010/V011: 1-knob V110/V111: 3-knobs	
Additional functions			
Integrated overload protection - Class 10	V10 models	V110/V111 models	
Remote alarm reset	-	V110/V111 models	
PTC input	-	■	■
Relay Outputs			
Top of ramp	■	■	■
Alarm relay	■	■	■
Run Relay	-	■	■
Accessories - Finger guards	-	A	A
Dimensions - WxDxH (mm)	45 x 150 x 105	75 x 180 x 221	120 x 180 x 221
Approvals	CE c UL us LISTED		

Built-in bypass results in energy saving

- Minimise energy consumption when pump reaches full speed
- Less heat dissipation when soft starter is running
- 3-phase control for a lower starting current
- Reduced current imbalance extends pump lifetime

Compact dimensions

- 3 frame sizes up to 90 A to optimise panel space
- Up to 25A (11kW) : 45mm wide housing
- Up to 55A (30kW): 75mm wide housing
- UP to 90A (45kW): 120mm wide housing

User friendly diagnostics

- LED indications for supply, run and alarms
- Unique flashing sequence for different alarms
- Auto or manual recovery of alarms (user selectable on units with overload protection)
- Alarm description available on side label

Dedicated to centrifugal pumps

- Algorithm specifically designed for centrifugal pumps
- RSWT will optimise the start and stop parameters in less than 10 starts
- Active all the time, means that you do not need to worry about varying load conditions
- Less user settings reduces human errors

Keeps your pump protected all the time

- Built-in overload protection Class 10
- PTC input
- Over- and under voltage protection, motor phase loss detection
- Shorted thyristor detection

Saves you time during installation

- Self-learning algorithm to optimise pump start/stop performance
- Internal supply for control electronis - less wiring required
- DIN rail or panel mount options - for increased installation flexibility
- Fewer user adjustments required - saves you time during commissioning

Selection Guide

Operational voltage (Ue)	Rated operational current (ie)	Supply voltage (Us)	Motor power 220V - 240 VAC (Pe)	Motor power 380 - 415 VAC (Pe)	Product Code
220 - 400 VAC	12 A	Internally supplied	3 kW / 3 HP	5.5 kW / 5 HP	RSWT4012X0VYY
	16 A		4 kW / 5 HP	7.5 kW / 7 HP	RSWT4016X0VYY
	25 A		5.5 kW / 7.5 HP	11 kW / 10 HP	RSWT4025X0VYY
	32 A		9 kW / 10 HP	15 kW / 15 HP	RSWT4032X0VZ10
	37 A		9 kW / 10 HP	20 kW / 20 HP	RSWT4037X0VZ10
	45 A		11 kW / 15 HP	22 kW / 25 HP	RSWT4045X0VZ10
	55 A		15 kW / 20 HP	30 kW / 30 HP	RSWT4055X0VZ11
	70 A		20 kW / 25 HP	37 kW / 40 HP	RSWT4070X0VZ11
	90 A		22 kW / 30 HP	45 kW / 50 HP	RSWT4090X0VZ11

X = Control voltage range - "E": 110 - 400 VAC, "F": 24 VAC/DC

YY = version - "00": No overload protection , "10": Built-in overload protection

Z = version - "0": No overload protection, "1": Built-in overload protection

Operational voltage (Ue)	Rated operational current (ie)	Supply voltage (Us)	Motor power 440V - 480 VAC (Pe)	Motor power 550 - 600 VAC (Pe)	Product Code
220 - 600 VAC	12 A	100 - 240 VAC or 24 VAC/DC	3 kW / 3 HP	5.5 kW / 5 HP	RSWT6012XXV10
	16 A		4 kW / 5 HP	7.5 kW / 7 HP	RSWT6016XXV10
	25 A		5.5 kW / 7.5 HP	11 kW / 10 HP	RSWT6025XXV10
	32 A	100 - 240 VAC	18.5 kW / 20 HP	22 kW / 30 HP	RSWT6032GGV110
	37 A		22 kW / 25 HP	30 kW / 30 HP	RSWT6037GGV110
	45 A		22 kW / 30 HP	37 kW / 40 HP	RSWT6045GGV110
	55 A		30 kW / 40 HP	45 kW / 50 HP	RSWT6055GGV111
	70 A	100 - 240 VAC or 24 VAC/DC	45 kW / 50 HP	55kW / 60 HP	RSWT6070XXV111
	90 A		55 kW / 60 HP	75 kW / 75 HP	RSWT6090XXV111

Note: For RSWT60 versions, same motor power as for corresponding RSWT40 models applies for use with 220 up to 415V supply.

XX = Control & supply voltage range - "FF": 24VAC/DC, "GG": 100 - 240VAC

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