



RLS Series Three Phase Thyristor Controllers

Abbreviated Data Sheet

RLS2000 series (2-leg Control) and RLS3000 series (3-leg Control)



Note: Data may be subject to change.

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RLS2000 / 3000 Series Three Phase Thyristor Controllers

A range of thyristor controllers suitable for all AC heating loads where voltage monitoring / feedback is not required (control is open loop).

Features

- ◆ Integrated thyristor controllers for the control of 3-phase AC loads
- ◆ Two versions - RLS2000 series for 2-leg control; RLS3000 series for 3-leg control
- ◆ Wide 3-phase voltage range - 200V to 480V or 200V to 690V.
- ◆ Current ratings from 63A to 800A
- ◆ Fitted with semiconductor fuses, snubber networks and MOVs where appropriate.
- ◆ Automatic phase rotation detection and line synchronisation
- ◆ Comprehensive user selectable firing modes
- ◆ Switch between two firing modes during operation using a digital input
- ◆ Suitable for transformer coupled loads
- ◆ Accept 0-5V, 0-10V, 1-5V, 2-10V, 0-20mA, 4-20mA control input
- ◆ Also accept logic (SSR Drive) control signal in burst fire or single cycle burst fire mode
- ◆ Auto / manual (local / remote) facility
- ◆ Power limit facility
- ◆ V^2 control law available in phase angle mode (open loop)
- ◆ Galvanically isolated digital inputs
- ◆ Volt free alarm contacts for heatsink over-temperature and loss of a phase
- ◆ Require a 24V DC supply for the control electronics and cooling fans

Firing Modes

The following firing modes are available:-

Burst fire with zero voltage switch on, single cycle burst fire with zero voltage switch on, burst fire with delayed firing angle switch on (RLS2000 only), soft start burst fire, phase angle (RLS3000 only).

Application Overview

These thyristor controllers are designed for the control of 3-phase AC heating loads in either burst fire, single cycle burst fire or (3-leg control only) phase angle control modes. The comprehensive user-selectable range of firing modes ensures that the one most suitable for a particular application can be chosen - after trying the different modes if wished.

The controllers accept a standard analogue input control signal. A second analogue input may be used as a manual input (with external potentiometer) or as a power limit input, or the two inputs may be considered as a 'lowest wins' pair. The controllers may alternatively be configured to operate with a 'logic' control signal.

The load may be either 3-wire star or delta or (with 3-leg control only) 4-wire star connected. All types have modes suitable for the control of both resistive and transformer-coupled loads.

The controllers are suitable for use on 3-phase supplies with nominal line voltage between 200V and 480V RMS (phase voltage up to 277V) or between 200V and 690V (phase voltage up to 400V) depending on the voltage rating chosen (480V or 690V). Over this voltage range synchronisation and phase rotation is determined directly from the 3-phase supply via the 3-phase line connections. A separate synchronisation input is provided (using a special adapter) to enable operation on a 24V RMS supply for use on low voltage high current test rigs.

The controllers require a 24V DC supply to power the control electronics and fans. The current rating of this supply depends on the type and number of fans fitted.

There is provision for a small optional daughter board to be fitted to the control card which can provide supplementary functions such as additional digital I/O or digital communications or (with 3-leg control) current limit facilities. Some of these additional features are not available at launch.

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Specifications

3-phase supply Line to Line Voltage	160V RMS minimum to 520V or 750V RMS maximum (nominal supply voltages between 200V RMS and 480V or 690V RMS (depending on specified voltage rating).
Current rating	Absolute maximum current as defined in the ordering information table at maximum ambient temperature.
Control Circuit Supply voltage	24V DC +/-10%
Current consumption of 24V DC supply	63A, 80A units 300mA SRC2000 100A - 250A units (1 fan) 1.1A SRC2000 315A - 800A., SRC3000 100A - 250A (2 fans) 1.8A SRC3000 315A - 800A (3 fans) 2.6A
Ambient temperature	0-50°C (800A unit 0-45°C)
Environmental conditions	Pollution degree 2 to IEC 60664-1
Input signal	0-5V, 0-10V, 1-5V, 2-10V, 0-20mA, 4-20mA, link selectable
Auxiliary input signal	0-5V (manual input) may be fed by a 4k7 to 10k ohm potentiometer powered from the unit
Digital input signals	Contact closure or transistor pull up / down (24V logic suitable for use with plc 24V signals.
Indicators	LED indicators for power, digital inputs active, relay outputs energised.
Safety Standards	Complies with European Low Voltage Directive and major international standards.
	Overvoltage category 2 or 3 (see below) , to IEC 60664-1
EMC Standards	Complies with European EMC Directive for operation in an industrial environment
Maximum working / withstand voltage between electrically separated circuits. (IEC 60664-1)	Working voltage between line and load circuits on the same phase: 480V or 690V RMS (depending on specified voltage rating)
	Working voltage between phases: 480V or 690V RMS (depending on specified voltage rating)
	Between 3-phase circuits and control circuits - reinforced insulation, overvoltage category 3 to 300V RMS*. Overvoltage category 2 to 600V RMS**, pollution degree 2, withstand voltage 4,000V RMS 50 / 60 Hz * Corresponds to nominal supply voltages up to 480V line to line with earthed neutral ** For nominal supply voltages between 600V and 690V line to line with earthed neutral.
	Between relay output contacts and other control ports - reinforced insulation 300V, overvoltage category 2, pollution degree 2 - withstand voltage 3,750V RMS 50 / 60 Hz
	Between analogue inputs - no isolation
	Between 24V supply and analogue inputs - no isolation
	Between any 2 digital inputs - no isolation
	Between analogue inputs / 24V supply and digital inputs - withstand voltage 1500V RMS 50 / 60 Hz
	Between analogue inputs / 24V supply terminals and ground - withstand voltage 1500V RMS 50 / 60 Hz
	Between digital inputs and ground - withstand voltage 1500V RMS 50 / 60 Hz

Fuses

The units are fitted with fast acting semiconductor fuses which are intended only to protect the thyristors against short circuits. Circuits must also be protected with standard HBC (gG) fuses or circuit breakers.

The control card is fitted with a 315mA type T fuse. The 24V supply should be protected with a fuse / circuit breaker suited to the current required by the control card and fan(s).

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LED Indicators

Marked	Colour	Function
PWR	Green	Power - Illuminates when the 24V DC power for the control electronics is present.
Inputs		
MAN	Green	Illuminates when digital input 1 (Manual) is activated and controller is obtaining its setpoint from terminal 11 (Manual control signal). (Note that if DIP switch 1 and 2 are both on the manual control signal does not operate although the LED may still be lit (The LED simply indicates that the input is activated).
EN	Green	Illuminates when digital input 2 (Enable) is activated. This input must be activated for the controller to operate.
IP3	Green	Illuminates when digital input 3 is activated. The function of this input is defined by DIP switches 1 and 2.
Relays		
RLY1 Supply Healthy	Green	Illuminates when Relay 1 is energised. Relay 1 energises when all 3 phases of the 3-phase supply are present and the controller has achieved phase lock. The relay de-energises 5 seconds after any phase or phase lock is lost.
RLY2 Tempr	Green	Illuminates when Relay 2 is energised. Relay 2 energises when the heatsink temperature is OK as determined by a normally closed sensor contact connected across connector CON11 (see figure 7). If the sensor is open the relay will de-energise, and also the controller will remove drive from the thyristors. CON11 terminals must be linked if no sensor is fitted.
OP	Green	Illuminates when the thyristors are switched on. In burst fire and single cycle burst fire modes the LED will flash on and off as the burst switches on and off. In phase angle mode the LED flashes very rapidly and will give the impression of getting brighter as the power output increases.
AL	Red	Alarm LED. Flashes codes indicating the cause of an alarm which prevents the controller from firing the thyristors. The flashes are 0.5 seconds on, 0.5 seconds off followed by a gap of 2 seconds. 1 flash One of the 3-phase lines is not present. 2 flashes Loss of phase lock. 3 flashes Heatsink is over-temperature (CON 11 not linked). 4 flashes System error. Causes microcontroller reset after flashing message 3 times.

Ordering Information

Series	2-leg or 3-leg	Current rating	Voltage rating	Control supply voltage	Options
RLS	2,000 3,000	63A 80A 100A 125A 250A 160A 200A 315A 400A 600A 800A	480V 690V	24V DC	Alarm relays ¹ MOVs ² Current limit ³

Notes: 1, fitted as standard on RLS3000; 2, MOVs recommended unless controlling a transformer; 3, RLS3000 only - check availability.

Dimensions

Model	Overall Width W	Horizontal Fixing Centres w	Body Height H1	Vertical Fixing Centres H2	Height inc. FixingClamps H3	Depth
RLS2000 (63-250A)	136 mm	86 mm	350 mm	382 mm	410 mm	63A 190mm Others 265mm
RLS3000 (80-250A)	256 mm	203 mm	350 mm	382 mm	410 mm	
RLS2000 (315-800A)	263mm	211mm	435mm	471mm	495mm	
RLS3000 (315-800A)	390mm	336mm	435mm	477mm	513mm	