

RS300

INVERSE TIME OVERCURRENT RELAY



1 DESCRIPTION

The RS300 is a digital protection relay against overloads and line-to-line or neutral shortcircuits.

Being a fully self-supplied system (RS300/ST model) protection is active even when no mains or battery power is available.

The equipment can be wall, flush or DIN rail mounted and takes up little space (89x83x132 mm).

2 OPERATIONAL PRINCIPLE

The RS300 implements the most usual inverse-time characteristics for the overload protection (51/51N).

- Normal inverse.
- Very inverse.

- Extremely inverse.
- Definite time.
- Out of service.

The short-circuit protection function (50/50N) trips instantaneously when a fixed current threshold (1-20 times the overload threshold) is exceeded. Being all-digital, the RS300 shows excellent timing repetitive.

Reliable operation is guaranteed by a continuous background self-checking algorithm.

3 ADDITIONAL FUNCTIONS

There are several overcurrent options that can be added to the RS300 base configurations.

3.1 RS300IT

Adds thermal imaging protection function (49). Besides, also adds a fixed time overcurrent over 5 and 30 minutes (51TD)

3.2 RS300PF

Adds a Fault Passing Indication algorithm based on the overcurrent detection followed by a main circuit breaker disconnection.

Signaling relative to Fault Passing can be fixed or intermittent (i.e.: connection of luminous indicators).

The signaling reset can be either manual (via keypad or digital input) or automatic (service restorage detection or fixed time).

4 DIGITAL INPUTS

Up to 4 digital inputs are available depending on the version which can be used for manual circuit breaker opening or signaling reset.

It can also be used to connect external voltage detectors or other field signals.

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5 POWER SUPPLY

The protection relay RS300 has been designed to be supplied in diverse modes:

- **RS300**: supplied by a continuous voltage provided by a battery and battery charger.
- **RS300/ST** : directly supplied from the low voltage electrical network (230VAC), and with self-supplied operation when no mains supply available.

The self-supply system of the RS300/ST uses its own current transformer output (with double coil) to supply the device.

The RS300ST model provides a voltage output in order to energize the trip coil in case of failure.

The high sensitivity of the self-supplied system (from 10mA in secondary amperes) allows the protection to be operational even when there is a low line current and use a lower power/cheaper toroidal transformer to do all functions.

6 COMMUNICATIONS

The relay has an USB local communications port to connect it to a computer and check settings/events or program the device by means of the provided software.

The MB version includes an RS485 communications port with MODBUS RTU support (depends on which model).

7 OTHER CHARACTERISTICS

There are three luminous signals at the frontal of the relay:

- **VCC** : power supply voltage.
- **I>** : Active communication link signaling.
- **ERROR** : Internal error detection.

The device stores in no-volatile memory the last 50 events. For each event the date, time, tripping phase and line current value is recorded.

The settings look up and programming can be done in local mode or through an easy-to-use alphanumeric 2x16 screen. From this screen is also possible to check line current measures, event log (last 50 events), and set/look up the date/time, etc.

In order to make easier the commissioning the relay has an USB port in the frontal that allows loading/download settings file.

Through this system is possible to calculate the settings beforehand at the office, generate the corresponding files and download directly to the device avoiding the use a computer on the field. Thus the commissioning time is reduced and potentially errors when the parameters are introduced by hand are prevented.

The RS300/ST model has a switch that allows looking up the last trip event even when no power is available.

The relay wiring is done by means of plug-in coupling connectors for an easier installation and speed up possible replacements.

8 TECHNICAL SPECIFICATIONS

Supply Voltage (Vaux)	Version 48	36 ÷ 150 Vdc ±20%
	Version 220	85 ÷ 264Vac ±20%
	Version ST	85 ÷ 264Vac ±20% + Self-Supplied
Functions	RS300	50, 51, 50N, 51N
	RS300IT	50, 51, 50N, 51N, 49, 51TD
	RS300PF	50, 51, 50N, 51N + fault passing indication
Line Overcurrent Threshold (51)	/5	0.5 ÷ 8A in steps of 0.25A
	/1	0.05 ÷ 1.6A in steps of 0.025A
Neutral Overcurrent Threshold (51N)	/5	0.25 ÷ 4A in steps of 0.025A (/5)
	/1	37.5 ÷ 600mA in step of 2.5mA
Shortcircuit Threshold (50/50N)	1 ÷ 20 times the overcurrent threshold.	
Accuracy	±3%	
Actuation	Timed: NI, MI, EI curves Fixed Time: 0 ÷ 20s in steps of 0.1s	
Pickup/Trip Reset	95% of the overcurrent threshold.	
Potential-free contacts	1 main trip, Normally Open. 1 malfunction alarm, Normally Closed. 5 signal contacts (depending on options).	
Power relays rating	16A/250Vac	
Signal relays rating	6A/250Vac	
Digital Inputs	Vaux±20% / 0.1W	
Trip Coil Output	Version ST	19V / 0.4J Impulse
Current inputs	2 phase and 1 neutral inputs. I _{th} = 5 x I _{nom} / 20 x I _{nom} (1s)	
Self Supplied operations	Version ST	Begins at 10mA secondary (0.2VA). I _{th} = 10A
Power consumption	< 0.6 VA @ 5A	
Storage Temperature	-20÷70 °C	
Operating Temperature	-10÷60 °C	

9 TESTINGS

- Dielectric strength: 2kV / 50Hz 1 min. according C.E.I 255-5.
- Surge 5 kV. peak 1.2/50 µs according C.E.I 255-5.
- Electrical disturbance testing of 1 MHz: 2.5 kV longitudinal y 1kV transversal, class III acc.CEI 255-5.
- Fast transient: 2kV according CEI 255-22-4 class III.
- Electromagnetic immunity tests: according to document UNIPEDE ref NORM (SPEC) 13."Automation and Control Apparatus for Generating Stations and Substations – Electromagnetic Compatibility Requirements."

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10 ORDERING CODES AND MODELS

Fig. 1 Shows the digital series ordering codes

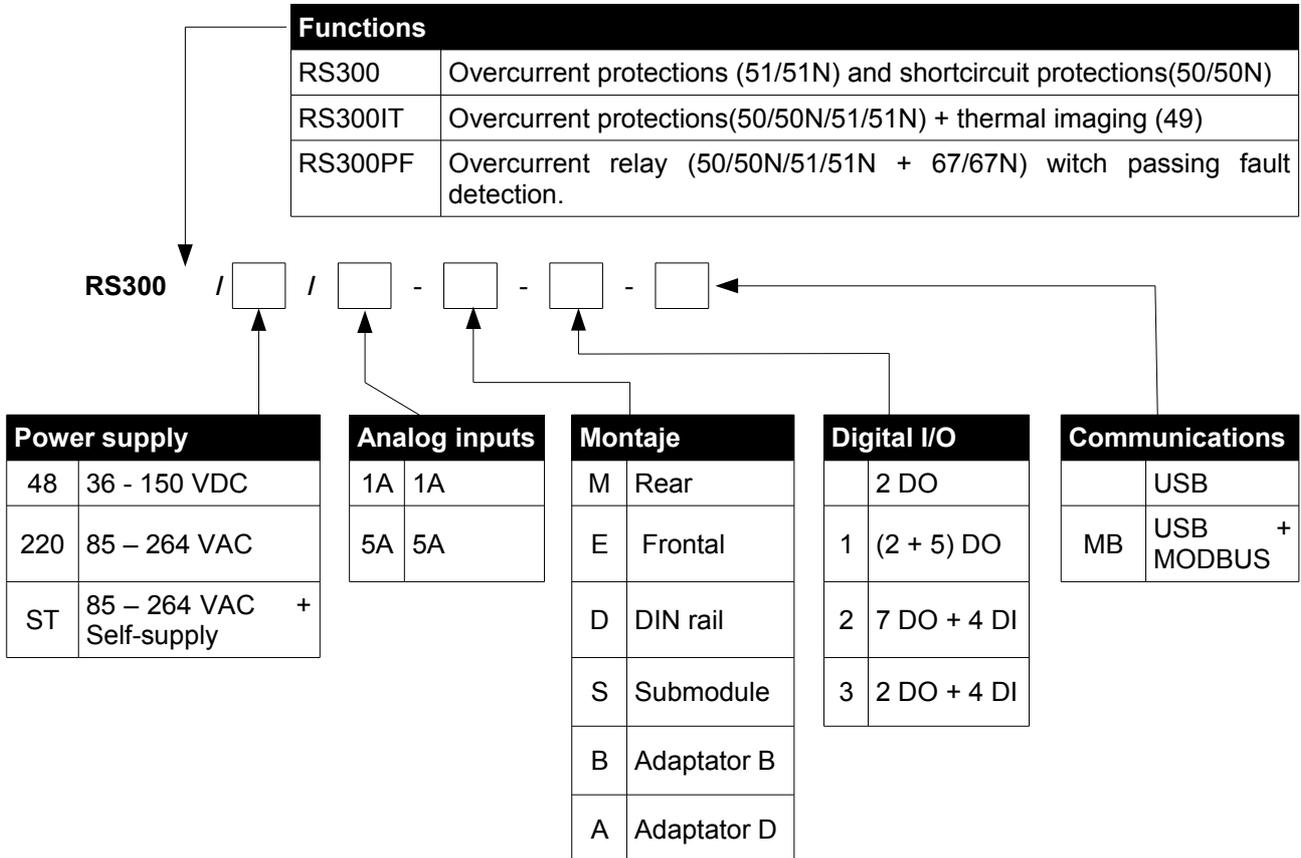


Fig. 1. RS300 Ordering codes

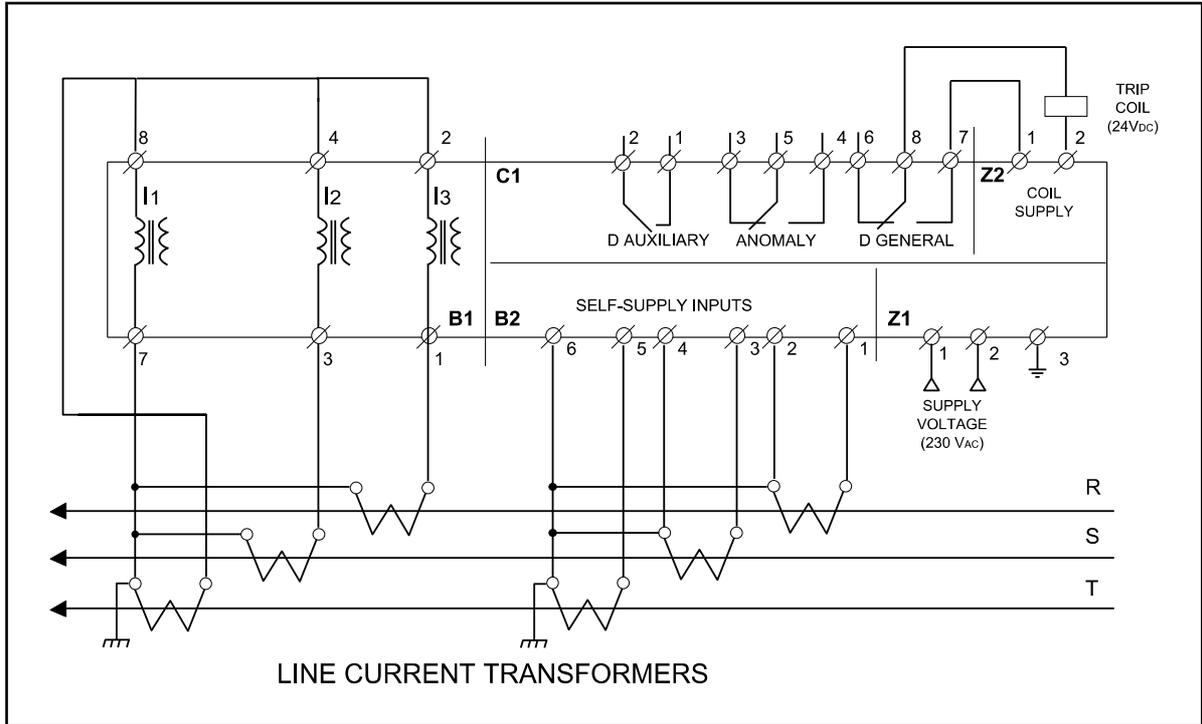


Fig. 2. RS300ST Clamping schematic to current transformers.

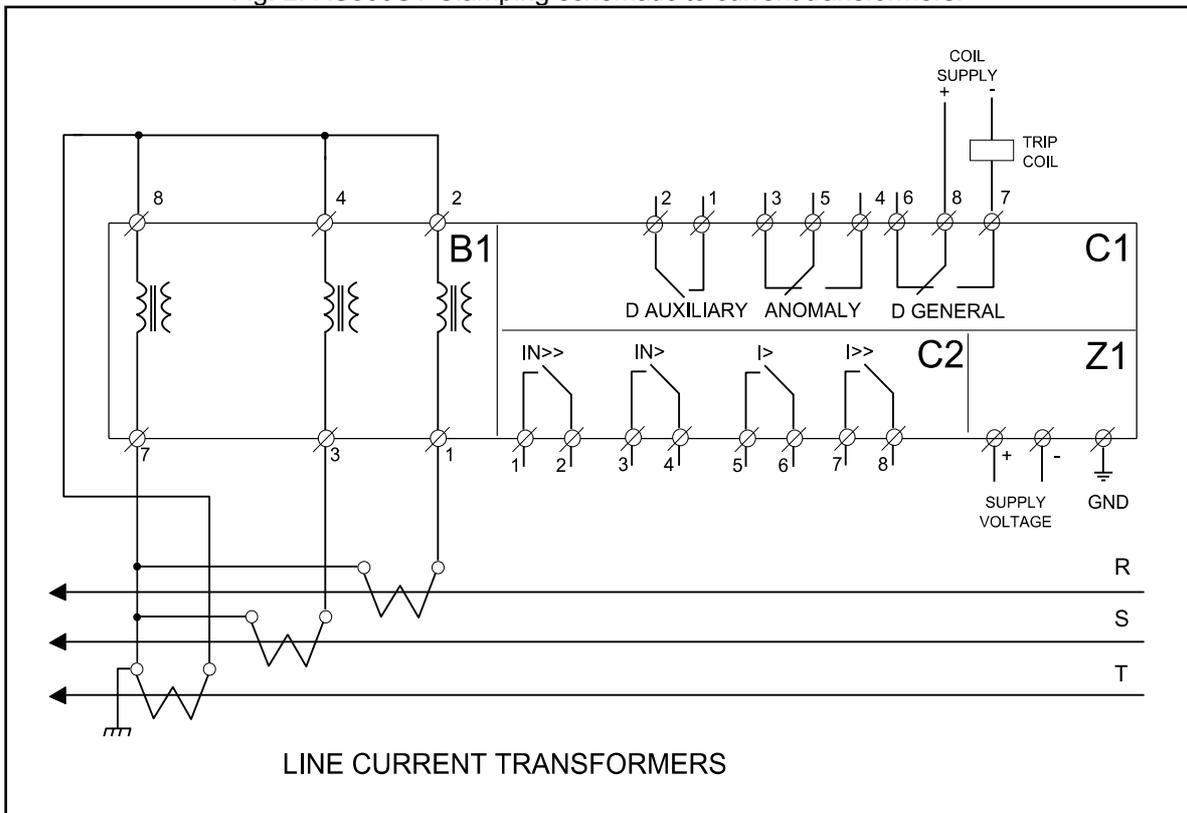
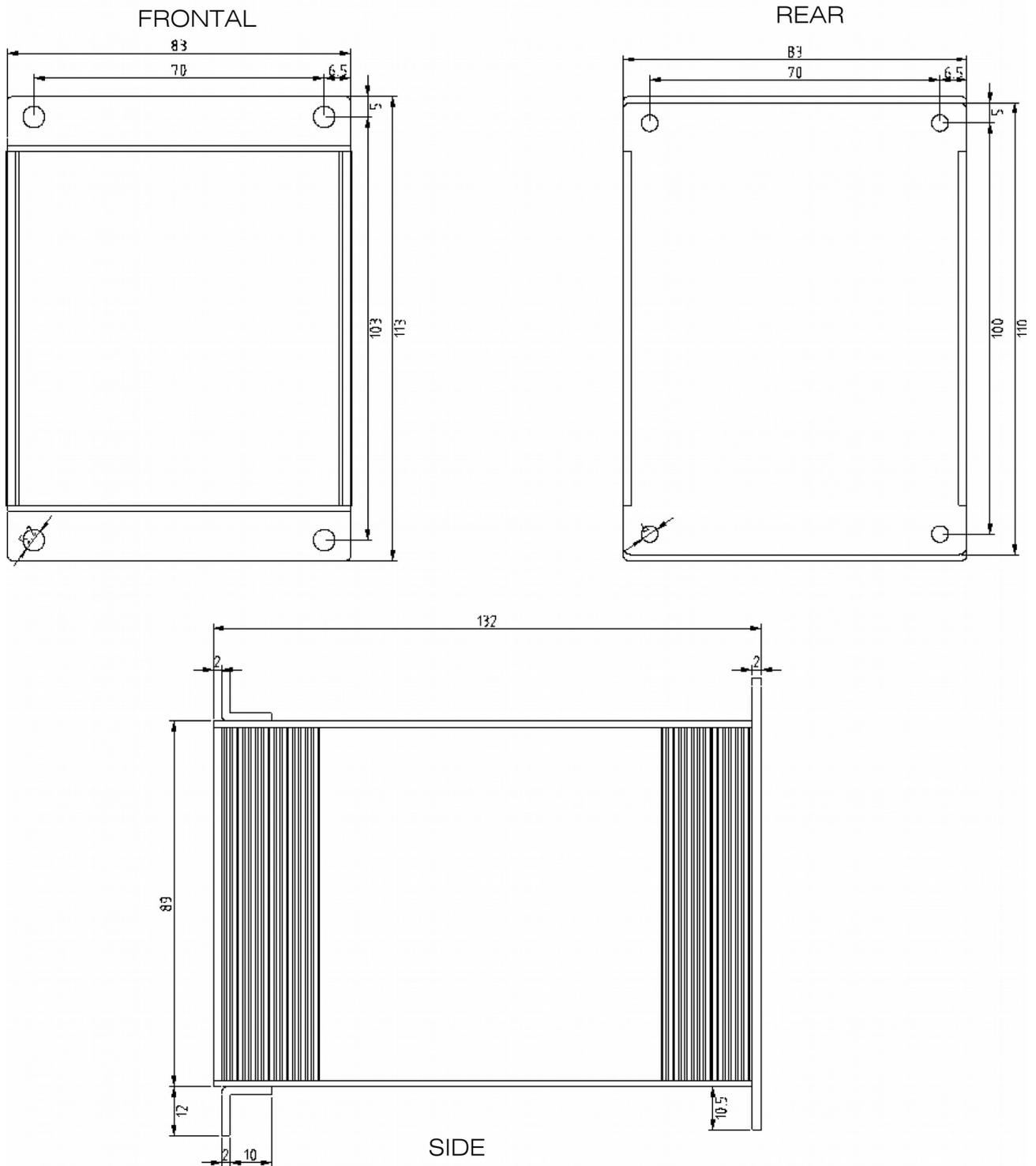


Fig. 3. RS300 Clamping schematic to current transformers.

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11 SIZE



Flush/wall mount version shown. Device without frontal fastenings and rear DIN rail mount also available.