RLC 500

RLC 500 Numeric Capacitor / Filter Protection Relay

The RLC 500 is a menu driven numeric protection relay designed for comprehensive protection of medium and high voltage capacitor banks and filter installations.
Two protection modes co-reside in one RLC 500: [Normal (N)] Star/delta/filter schemes & [H-Bank (H)] configuration.

Features

Subject	Function
Clock	Trip history with real time stamping.
Power fail	Power up: Restore to pre-power loss state.
Aux power	Two AC/DC ranges
LED's	Status indication on relay and HMI
Function	The relay can fully function without the HMI
Function	Harmonic voltage capacitor stress protection
Programming	Can be programmed from PC or HMI keys.
Software	Full programming/data retrieval to database
Commissioning	[N/H] Natural capacitor phase unbalance can be compensated for finer protection.
Commissioning	Outputs can be manually operated for tests.
Commissioning	Inputs status can be monitored.

Protection parameters for N & H mode operation

Mode	Protection Functions
[N]	Thermal overheating – From overcurrent.
[N]	Overcurrent.
[N]	Over voltage - From harmonics.
[N or H]	Unbalance - Phase current.
[N]	Unbalance - Star point.
[N]	Earth fault
[N]	Capacitor bank discharge timer – Inhibit reclose.
[N]	Harmonic filter - Overcurrent
[N]	Harmonic filter – Overvoltage due to harmonics
[N]	Resistor - Overcurrent

System failure monitoring

Mode	Functions
[N]	Breaker fail – fail to open.
[N]	Capacitor supply failure - Low current.

Inputs

Type	Description
Current	4 x CT's programmable for 1A or 5A
Virtual	1 x Virtual CT for I_0 and unbalance
Digital	5 x optically isolated status inputs

Outputs

Form	Description
SPDT	5 x control relays: Programmable N/O or N/C
SPDT	1 x control relay: RLC 500 healthy
SPST	3 x SSR signal relays: Programmable N/O or N/C

Communications

Location	1 x Expansion module plug-in slot
Relay rear	Plug-in: RS485 Comms, (Basic module).
Relay rear	Plug-in: TCP/IP-RS485.
Relay rear	Plug-in: IEC 61850-485.
	Standard on HMI
HMI front	1 x USB-A host connector.
	1 x USB-B device connector

Product make-up

Main parts	Assembly makeup
HMI	Graphic Human Machine Interface
	Standard: 2 x USB connections
Relay	Assembly makeup
	1 x Enclosure
	1 x cassette (main relay body) removable.
	1 x slot for remote communications board.

Specifications

Measuring Elements	Elements:	Quantity:	4			
		Nominal rated current, In:	1A or 5A software selectable			
		Continuous current:	15A			
		Short time current:	300A for 1s			
		Burden:	<40mΩ			
		Accuracy of measurement:	+/- 2% of nominal rated current			
	Harmonics:	Harmonic range:	>50th			
Auxiliary Power Supply			Option 1 AC or DC range		*Option 2 AC or DC range	
			AC supply	DC supply	AC supply	DC supply
	Voltage:	Range:	60 – 220 +/-20%	84 – 312V +/-20%	16 – 42VAC +/- 20%	22 – 60V VDC +/- 20%
		Quiescent state burden:	11.2VA	5.4W	---	---
		Maximum load burden:	31.5VA	17.5W	---	---
		Max inrush current:	230V: 20A for 20ms		---	---
Control Relay Outputs	K1:	Contacts operating Max:	380VAC, 250 VDC			
		Contact form:	SPDT (NO & N/C)			
		Burden:	1W			
		Contacts rated load:	Resistive load: (cos φ = 1)		Inductive load: (cos φ = 0.4 L/R = 7 ms)	
			5A at 250 VAC		3.5A at 250 VAC	
			1A at 220 VDC		0.8A at 220 VDC	
			3A at 110 VDC		2A at 110 VDC	
			5A at 48 VDC		4A at 48 VDC	
	K2, K3, K4, K5, K6	Contacts rated load:	Resistive load: (cos φ = 1)		Inductive load: (cos φ = 0.4 L/R = 7 ms)	
			5A at 250 VAC		3.5A at 250 VAC	
			5A at 30 VDC		2.5A at 30 VDC	
		Rated carry current:	5A			
		Max. operating voltage:	380VAC, 125 VDC			
		Min. permissible load:	100mA at 5 VDC			
		Contact form:	SPDT (NO & N/C)			
		Burden per each:	530mW			
Signal Relay Outputs	SR1, SR2, SR3	Solid state relays:	3 x SSR (N/O)			
		Rated carry current:	200mA			
		Max operating voltage:	250Vac/dc			
		Burden:	20mW			
Digital Inputs	Inputs 1, 2, 3, 4, 5,	Quantity:	1, 2 & 3 allocated; 4 & 5 for future use.			
		Functions:	Breaker on; Remote reset; Event trip.			
		Isolation:	Optically isolated. 3750VRMS			
		Voltage range:	30 – 110Vac/dc voltage input.			
		Burden:	Per input 2.5W			
Human Machine Interface (HMI)	Keys:	Capacitive touch:	Function: ◄, ►, ▲, ▼, and ↵ Accept			
	Display:	Type:	Full colour graphic			
		Screen Size:	Landscape 96mm x 55mm. displays scrollable via keypad.			
		Standard character height:	Standard 2.5 mm: Graphics can be displayed larger or slightly smaller relating to language requirements.			
		Operating temperature:	-20 ~ +70°C.		Storage temperature -30 ~ +80°C	
	Indicators:	Light Emitting Diodes:	Green LED: HEALTHY			
		Function:	Yellow LED: ALARM			
			Red LED: TRIP			
	Communication interfaces:	Isolation:	Optically isolated			
		Front port type:	1 x USB-A host socket/connector			
			1 x USB-B device socket/connector			
RLC 500 IP	Environment	IP rating	HMI (Front) IP51		Enclosure terminal bock (Rear) IP20	
Cassette faceplate	Indicators:	LED functions:	Green LED: HEALTHY			
			Yellow LED: ALARM			
			Red LED: TRIP			
Expansion modules	Communications modules:		RS485 Comms, type No CR EXP - RS (Basic module) - MODBUS RTU Default to all RS485 expansion modules			
			TCP/IP-RS485 type No: CR EXP - T.			
			- Link LED: Off = no link, Amber = 10Mbps, Green = 100Mbps			
			- Activity LED: Off = no activity, Amber = half duplex, Green = full duplex			
			IEC 61850-485 type No: CR EXP – C			
			- Ethernet Port: 1 x RJ45, Mode – Full or half duplex (auto sensing), Data rate – 10/110 Mbps (auto sensing).			
			- LED's: Green LED: Rx/Tx, Yellow LED: Link status, Red LED: Power			
Real Time Clock		Functionality:	Date; Weekday; hh:mm:ss			
		Accuracy:	+/- 30s per month			
		Backup Supercap:	Maximum charge period 1 hour: >10 days support without power.			
Weight		Mass:	3.84 kg fully assembled (excludes packaging).			
		Shipping weight:	4.1kg fully assembled including packaging.			
Dimensions		Millimetres	Overall: 135W x 177H x 295D. Cut-out: 136W x 157H			
Updated:2016/05/31	* Check when option available		*Please note these specifications are subject to change without notification*			