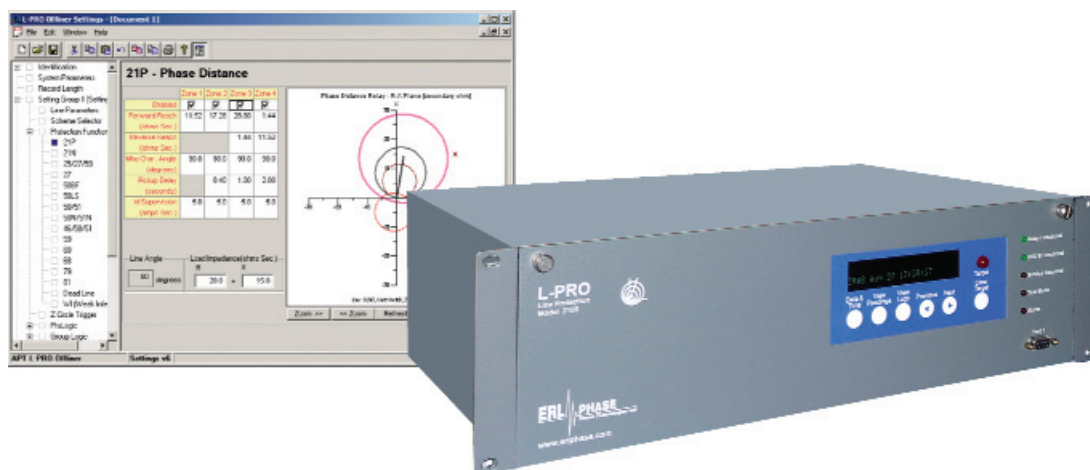


L-PRO 2100 Multi-function Transmission Line Protection Relay

- Easy to use with intuitive settings and analysis software
- Offers reliable protection with superior transient fault and dynamic swing recording
- Common look and feel with other ERLPhase relays and recorders



The L-PRO 2100 relay provides comprehensive distance based line protection, DFR quality fault oscillography, standard ring bus capability, swing recording, event logging, SCADA control and metering in a fully integrated protective relay solution.



- High-speed four-zone user-defined mho or quad phase and ground distance protection
- Designed for ring bus and breaker-and-a-half applications — breaker failure and individual breaker monitoring
- 4 shot recloser with dead line/dead bus control and sync check
- Fault location information provided by event log access or analog input point for SCADA
- IRIG-B time stamping and sample synchronization
- 6 voltage channels and 12 current channels for use as small DFR for HV substations
- 96 s/c fault recording, dynamic swing recording and event logging (1 ms)
- Protection functions — IEEE devices 21P, 21N, 25/27/59 (25C), 27, 50BF, 50LS, 50/51/67, 50N/51N/67, 46/50/51/67, 59, 60, 68, 79, 81, Dead Line Pickup (SOTF) and Weak Infeed

L-PRO 2100 Multi-function Transmission Line Protection Relay

Protection

- 4 zones of phase and ground distance functions — user-defined mho shapes or quadrilateral shapes and communication based schemes
- Protection functions — IEEE devices 21P, 21N, 25/27/59 (25C), 27, 50BF, 50LS, 50/51/67, 50N/51N/67, 46/50/51/67, 59, 60, 68, 79, 81, Dead Line Pickup (SOTF) and Weak Infeed
- 1.0 to 1.3 cycle operation at 80% reach, ideal for transmission line applications
- Ring bus capability — breaker failure and individual breaker monitoring
- 4 shot recloser with dead line/dead bus control and sync check
- CCVT compensation
- ProLogic — 12 control logic statements
- 8 setting groups with setting group logic
- Optional expanded I/O, up to 20 external inputs and 21 outputs

Recording, Monitoring and Metering

- High quality recording — fault recording (96 samples/cycle), dynamic swing recording and event logging
- Fault location — information provided by event log access or analog input point for SCADA
- Breaker monitoring
- Metering functions for each input connection

Substation Automation – Ethernet Ready

- Direct-connect DNP3 and Modbus SCADA communication protocols
- 3 communication RS-232 ports
- IRIG-B time stamping and sample synchronization
- 30 virtual inputs for local and remote control
- Standard 100BASE-TX Ethernet Port
- Optional internal modem

Easy to Use

- User-friendly relay setting and record analysis software (Windows® 2000/XP) included
- Intuitive ASCII-terminal interface provides full local or remote access

L-PRO 2100 Multi-function Transmission Line Protection Relay

Item	Quantity/Specs	Notes
General		
Nominal Frequency	50 or 60 Hz	
Operating Time	16-25 ms typical	Including relay output operation
Sampling Rate	96 samples/cycle	Records up to 25th harmonic
Power Supply	Range: 48–250 Vdc, 120 Vac	Power Consumption: 25-30 VA (AC) 25-30 W (DC)
Protection Functions		
IEEE Dev. 21P (4 zones), 21N (4 zones), 25/27/59 (25C), 27, 50BF, 50LS, 50/51/67, 50N/51N/67, 46/50/51/67, 59, 60, 68,79, 81, Dead Line Pickup (SOTF) and Weak Infeed	2 x 3-phase voltage inputs (6 voltage channels) for synchronizing during reclosing	Ring bus configuration and integrated HV breaker auto-recloser
ProLogic	12 statements/setting group	5 inputs per statement
Setting Groups	8 (16 group logic statements per setting group)	
Recording		
Record Capacity	Up to 30 seconds of records per single phase unit. Each record can be up to a maximum of 2 seconds.	Viewing software provides waveform, symmetrical components, harmonic analysis and impedance locus analysis
Transient	96 s/c oscillography of all analog and external input digital channel	
Dynamic Swing	1 samples/cycle or 60 samples/second, each swing record up to 120 seconds	Line positive sequence voltage, current and frequency, W Var and Z
Events	250 events	1 ms resolution. When the "event auto save" is enabled a compressed event record is created is created approximately every 230 events
A/D Resolution	13 bits, 8192 counts full scale peak–peak	
Input & Output		
Analog Voltage Inputs 2 sets of 3-phase voltage inputs (6 voltage channels)	Nominal Voltage Continuous rating over voltage Maximum over-scale thermal rating Burden	V _n = 69 Vrms 2x V _n = 138 Vrms 3x V _n = 207 Vrms for 10 seconds <0.15 VA @ 69 Vrms
Analog Current Inputs 4 sets of 3-phase current inputs	Nominal Current Full Scale/Continuous Maximum full-scale rating Thermal Rating Burden	I _n = 5 Arms 3x I _n = 15 Arms 20x I _n = 100 A for 1 seconds (no distortion) 80x I _n = 400 A for 1 seconds <0.25 VA @ 5 Arms
External Inputs (digital)	9 inputs (L-PRO Model 2100) 20 inputs (L-PRO Model 2100E)	Two options: 48-125 or 125-250 Vdc
Output (contacts)	14 programmable outputs and 1 relay inoperative output (L-PRO Model 2100) 21 programmable outputs and 1 relay inoperative output (L-PRO Model 2100E)	Externally wetted Make: 30 A as per IEEE C37.90 Carry: 8 A Break: 0.9 A at 125 Vdc 0.35 A at 250 Vdc

L-PRO 2100 Multi-function Transmission Line Protection Relay

Item	Quantity/Specs	Notes
Interface & Communication		
Front Display	2 lines x 24 characters, fluorescent	Exceptional visibility in all ambient light conditions.
Front Panel Indicators	6 LEDs	Target, Relay Functional, IRIG-B Functional, Service Required, Test Mode, Alarm
Serial User Interface	Front and rear RS-232 ports to 57.6 K baud	Rear port can support an external modem
Network	100BASE-TX Ethernet port	Standard Ethernet card
Internal Modem	33.6 Kbps, V.32 bis	Optional internal modem
SCADA Interface	DNP3 or Modbus	DNP3: Ethernet or RS-232, Modbus: RS-232
Time Sync	IRIG-B, BNC connector	Modulated or unmodulated, auto-detect
Self Checking/Relay Inoperative	1 contact	Closed when relay inoperative
Environmental		
Ambient Temperature Range	-40°C to 85°C for 16 hours -40°C to 70°C continuous	IEC 60068-2-1, 2
Humidity	Up to 95% without condensation	IEC 60068-2-30
Insulation Test (Hi-Pot)	Power supply, analog inputs, external inputs, output contacts at 2.0 kV, 50/60 Hz, 1 minute	IEEE C37.90.1 / (IEC 61000-4-4/ IEC 60255-22-4): Class 3
Electrical Fast Transient		IEEE C37.90.1: 4kV / IEC 60255-22-4 Class 3 / IEC 61000-4-4: Level 3
Oscillatory Transient		IEEE C37.90.1: 2.5 kV / IEC 60255-22-1: Level 3 / IEC 61000-4-12): Level 3
RFI Susceptibility		IEEE C37.90.2: 35 V/m / (IEC 255-22-3/ IEC 61000-43): Level 3
Vibration, Shock and Bump		(IEC 60255-21-1, 2 / IEC 60068 2-8, 27, 29): Class 1
Conducted RF Immunity		(IEC 60255-22-6 / IEC 61000-4-6): Level 3
Voltage Interruptions	200 ms interrupt	IEC 60255-11 / IEC 61000-4-11
Physical		
Weight	11.1 kg (2100), 14.5 kg (2100E)	24.47 lbs (Model 2100) 32.0 lbs (Model 2100E)
Dimensions	11.1 kg (2100), 14.5 kg (2100E) 13.3 cm high x 48.3 cm wide x 30.5 cm deep (2100), 17.7 cm high x 48.3 cm wide x 30.5 cm deep (2100E)	5.25" high x 19" wide x 12" deep Model 2100) 7" high x 19" wide x 12" deep (Model 2100E)
Mounting	Vertical or horizontal	Specify at time of order

NOTE: The L-PRO 2100 is also available with 1 amp current input.
All current specifications would change accordingly.