

Feeder Protection Relay

F-PRO

Product Overview

F-PRO relays are a family of numerical multifunction protection relays which provide protection for a range of transmission, distribution and industrial applications. For ease of use, all F-PRO relays are designed on common hardware platforms and similar user software providing the same look and feel to the user. Draw out construction of the relay case and user-friendly settings enable easy use and maintenance. The variants within this family of relays are provided with features required to address specific applications.

The F-PRO116 relay provides current operated elements to suit the requirements for variety of utility distribution networks and industrial applications.

Application

F-PRO116 relay provides multi functional over current protection for Distribution Feeders, Capacitor Banks, AC Motors and Transformers.

Integration to SCADA and Substation Automation and Monitoring Systems are provided through serial communication protocols (IEC 60870-5-103 or Modbus RTU/ASCII).



Features & Benefits

Measurement & Monitoring

- Phase Currents
- Residual Current
- Sequence Currents
- Frequency and Phase Angles
- Percentage Thermal State
- Monitoring - status of External Inputs and Relay Outputs

Communication Interface

Front: USB 2.0 port

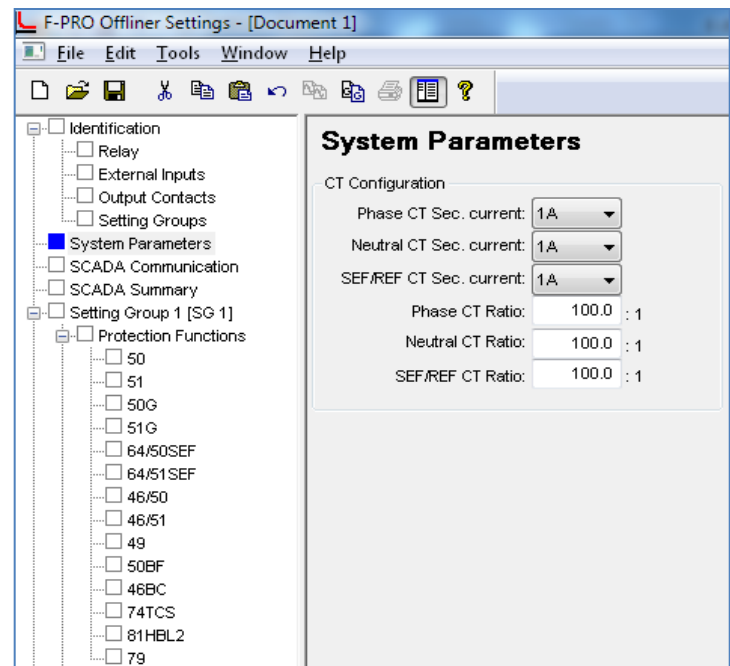
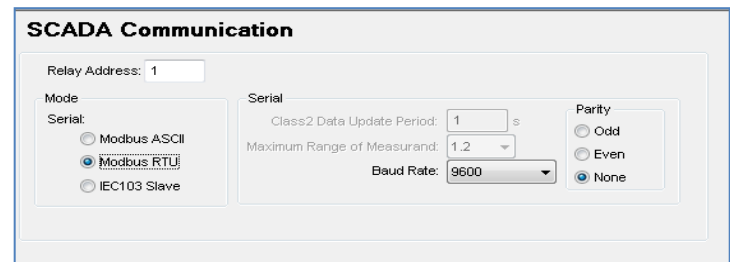
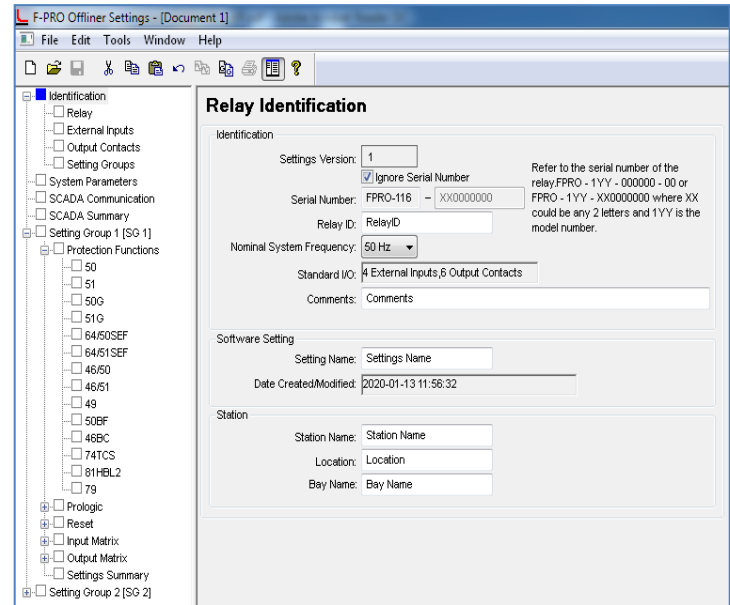
Rear: RS485

Communication Protocol

- Modbus RTU/ASCII
- IEC 60870-5-103

Functional Overview

- Site selectable 1A and 5A CT secondary ratings
- Programmable IEC Inverse, ANSI Inverse, Definite Time and User Defined Curves
- Programmable Self/Hand reset Output Contacts
- Programmable Self/Hand reset LEDs
- 10 Fault Logs
- 200 Event Records with 1ms time tag
- 2 Setting Groups
- Multilevel Password Protection
- 7 Programmable LEDs & 1 fixed LED for Relay Health Status
- Programmable Frequency (50Hz or 60 Hz)
- 2 X 16 character alphanumeric LCD Display
- 4 Programmable External Inputs
- 6 Programmable Output Contacts

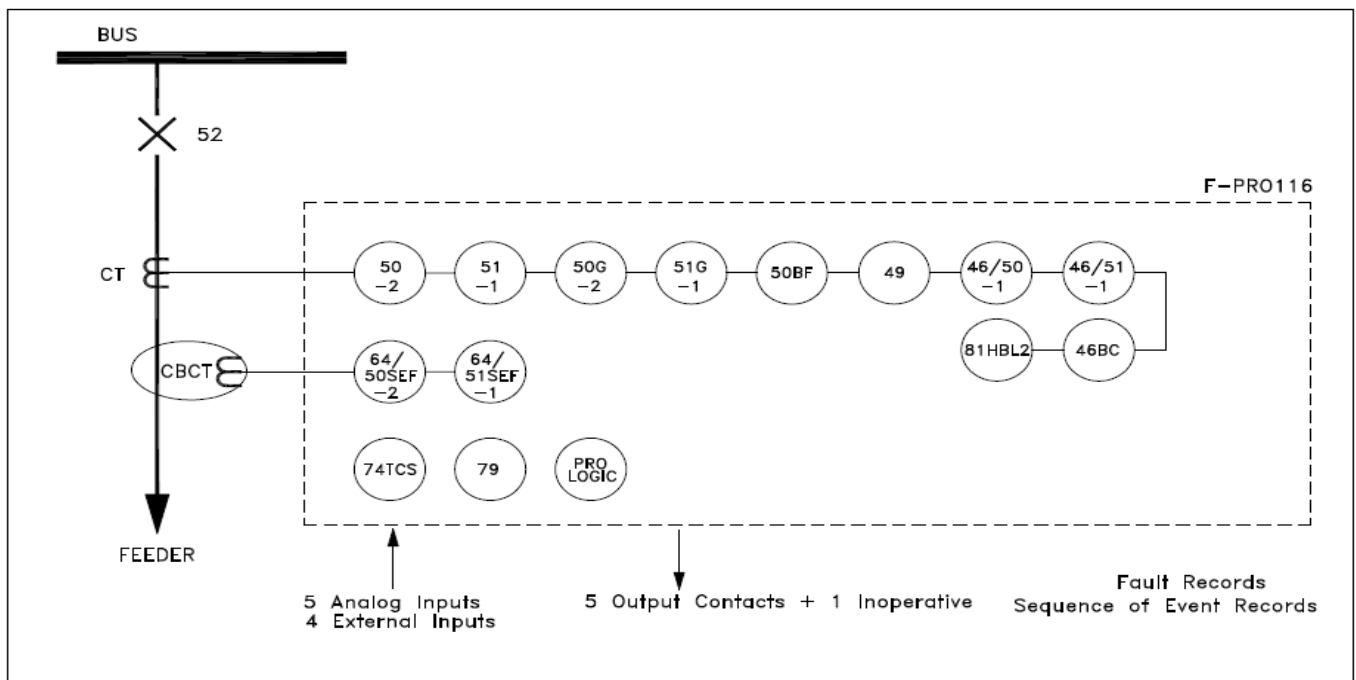


Protection Functions and Hardware Details

SL.NO.	ANSI NO.	PROTECTION FUNCTION DETAILS	NO. OF STAGES
1	50	Instantaneous Phase Overcurrent	2
2	51	IDMTL Phase Overcurrent	1
3	50G	Measured Instantaneous Neutral Overcurrent	2
4	51G	Measured IDMTL Neutral Overcurrent	1
5	64/50SEF	Instantaneous SEF	2
6	64/51SEF	IDMTL SEF	1
7	46/50	Instantaneous Negative Sequence Overcurrent	1
8	46/51	IDMTL Negative Sequence Overcurrent	1
9	49	Thermal Overload	1
10	50BF	Breaker Failure	2
11	46BC	Broken Conductor (I2/I1)	1
12	74TCS	Trip Circuit Supervision	2
13	79	Multishot Auto Reclose	1

SL.NO.	HARDWARE DETAILS	QTY
1	No of CT'S	5
2	No of LED'S	8
3	No of Digital Outputs	6
4	No of External Inputs	4

Protection & Control Function Diagram



Detailed Specifications

F-PRO116: Feeder Protection Relay

Auxiliary Power Supply

Nominal	Operating range
24/30 Vdc and 48/50 Vdc	20 to 60 Vdc
110/120 Vdc and 220/250 Vdc	80 to 300 Vdc 100 to 250 Vac

External Inputs

4 External inputs	Pick up level
24/30 Vdc	≥19 Vdc
48/50 Vdc	≥38 Vdc
110/120 Vdc	≥88 Vdc
220/250Vdc	≥175 Vdc

Continuous Rating

CT Circuit	4 X I _n AC
------------	-----------------------

Burden

AC Current Input	<0.1VA @1A, <0.5VA@5A
External Input	<0.1W @110V DC
Power Consumption	<3.5VA

Temperature Range

For Storage	-40°C to +85°C
For Operation	-10°C to +70°C

CASE SIZE	CUT OUT		BEZEL	
	A	B	C	D
E4	159	97	177	103.50

Note:

- All dimension are in mm and are measured equidistant from center line
- Maximum depth of equipment inside the panel is 175mm

Analog Inputs

Rated current (I _n)	1A or 5A AC (site selectable)
Frequency	50Hz / 60Hz (site selectable)

Digital Outputs

Carry Continuous	8A AC or DC
Make & Carry	30A AC or DC for 0.2seconds 5000VA AC Resistive Load
Break	1250 VA AC Resistive Load 50W DC Inductive Load @L/R <40msec with 110V DC

Short time Thermal Rating

CT circuit	100A for 1 sec (1A CT)
------------	------------------------

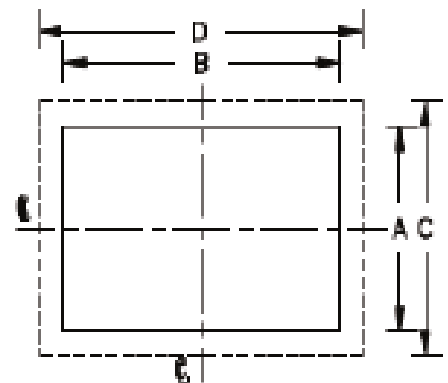
Physical Dimensions

Weight

2.0Kg (Approx.)

Dimensions

177mm (H) x 103.50mm (W) x 175mm (D)



Detailed Specifications

F-PRO116: Feeder Protection Relay

Item	Quantity/Specs	Notes
General		
Operate Time	1.0 to 1.5 cycles	Including relay output operation
Memory	Settings and records are stored in non-volatile memory Records are stored in a circular buffer	
ProLogic™	5 statements per setting group	5 inputs per ProLogic™ statement
Recording		
Events	200 event records with 1ms resolution	
Faults	10 fault records	

Overall F-PRO Accuracies

Current	±2.5% of inputs from 0.1 to 1.0 x nominal current (I_N) ±1.0% of inputs from 1.0 to 2.0 x nominal current (I_N)
Timers	±3ms of set value
Inverse Over current Timers	±2.5% or ±1 cycle of selected curve
Definite Over current Timers	±2.5% or ±1 cycle non-directional

Detailed Environmental Tests

Standard	Description of the Test	Test Points	Test Level
IEC 60255-26:2013 Cl.No.7.2.3	Electrostatic Discharge	Enclosure Air Enclosure Contact	+/- 8 kV +/- 6 kV
IEC 60255-26:2013 Cl.No.7.2.4	Radiated Interference (Electromagnetic Field Immunity)	Enclosure ports	10 v/m: 80-1000 MHz: 1.4 GHz - 2.7 GHz
IEC 60255-26:2013 Cl.No.7.2.5	Electrical Fast Transient	Ac/Dc power ports AC voltage & current ports External I/P & O/P ports	+/- 4 kV
IEC 60255-26:2013 Cl.No.7.2.6	Slow Damped Oscillatory / High Frequency Disturbance / 1 MHz Burst Disturbance	Ac/Dc power ports C voltage & current ports External I/P & O/P ports	+/- 2.5kV (CM) +/-1kV (DM)
IEC 60255-1:2009	Ingress Protection	Front Rear	IP 51 IP 10

Standard	Description of the Test	Test Points	Test Level
IEC 60068-2-1	Cold test– Operational		-10°C / 16Hrs
IEC 60068-2-1	Cold test– Storage		-40°C / 16Hrs
IEC 60068-2-2	Dry heat test– Operational		+55°C / 16Hrs
IEC 60068-2-2	Dry heat test– Storage		+70°C / 16Hrs
IEC 60068-2-14	Change of temperature		-25°C & +55°C / 5Cycles
IEC 60068-2-30	Cyclic temperature		+25°C & +55°C / 5Cycles
IEC 60068-2-78	Damp heat steady state		+40°C / 240Hrs
IEC 60255-21-1 Class 1	Vibration		10Hz to 150Hz, 1.0g, 1.0 Octave/min, 20 Sweep cycle/axis
IEC 60255-21-2 Class 1	Shock and Bump		5g and 15g
IEC 60255-21-3 Class 1	Seismic		5Hz to 35Hz, 1.0g, 1.0 Octave/min, 1 Sweep cycle/axis

WORKS:

Easun Reyrolle Ltd.,
 #98, Sipcot Industrial Complex,
 Hosur - 635 126,
 India.
 Tel: +91 4344 401600/01/02
 Fax: +91 4344 276397
 E-Mail: hosur@easunreynolle.com

ERLPhase Power Technologies Ltd.,
 74 Scurfield Blvd,
 Winnipeg, MB, R3Y 1G4,
 Canada.
 Tel: +1 204-477-0591
 Fax: +1 204-478-1697
 E-Mail: info@erlphase.com

The policy of ERL is continuous improvement and development. The Company therefore reserves the right to supply equipment which may differ slightly from that described and illustrated in this publication (E00041R01.10).

Technical Support: techsupport@easunreynolle.com / support@erlphase.com

www.easunreynolle.com / www.erlphase.com

