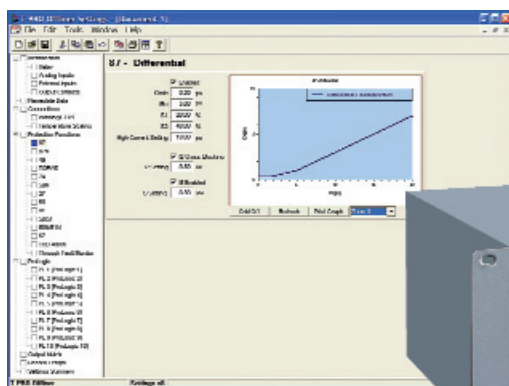


## T-PRO 8700 Multi-function Transformer Protection & Monitoring Relay

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



The T-PRO relay provides complete transformer fault and overload protection, DFR quality fault oscillography, sequence of event logging, trend recording, transformer monitoring and overload early warning (TOEWS) in a fully integrated protective relay solution.



- TOEWS function provides accurate thermal overload protection of transformers with predictive 15 and 30 minute alarms
- 5 current inputs for ring bus and breaker-and-a-half
- Asset management to maximize use of transformer capacity (ANSI/IEEE C57.91-1995)
- IRIG-B time stamping and sample synchronization
- 96 s/c fault recording, 30–600 day load trending and event logging (1ms)
- Protection functions include IEEE devices 87, 87N, 49, 67, 50/51, 50N/51N, 24INV/DEF, 59N, 60, 81, THD, 27, Temperature Control and TOEWS©
- Protects 2 or 3 winding transformers, auto-transformers and reactors

# T-PRO 8700 Multi-function Transformer Protection & Monitoring Relay

## Protection

- 5 sets of CT inputs for differential protection
- Software control compensates current magnitude and angle
- Protection functions include IEEE devices 87, 87N, 49, 67, 50/51, 50N/51N, 24INV/DEF, 59N, 60, 81, THD, 27, Temperature Control and TOEWS©
- ProLogic — 10 control logic statements
- Asset management to maximize use of transformer capacity (ANSI/IEEE C57.91-1995)

## Recording, Monitoring and Metering

- High quality recording — fault recording (96 samples/cycle), 30 to 600 day load trending and event logging (1 ms)
- Adaptive overload — auto-adjust overload characteristics based on temperature
- Controlled load management
- Transformer Overload Early Warning System (TOEWS©) with predictive 15 and 30 minute alarms
- Through fault monitoring

## Substation Automation – Ethernet Ready

- Direct-connect DNP3 and Modbus SCADA communication protocols
- Three communication RS-232 ports
- IRIG-B time stamping and sample synchronization
- Standard 100BASE-TX Ethernet Port
- Optional internal modem

## Easy to Use

- Easy to use, simplified relay setting and record analysis software (Windows® 2000/XP) included
- Intuitive ASCII-terminal interface provides full local or remote access

## T-PRO 8700 Multi-function Transformer Protection & Monitoring Relay

Item	Quantity/Specs	Notes
<b>General</b>		
Nominal Frequency	50 or 60 Hz	
Operating Time	12-24 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)
<b>Protection Functions</b>		
IEEE Device 87, 87N, 49, 50/51, 50N/51N, 24INV/DEF, 59N, 60, 81, THD, 27, 67, Temperature Control and TOEWS	2 or 3 winding transformer with 5 sets of 3-phase current inputs, 1 set of 3-phase voltage inputs. 2 temperature inputs (4-20 mA DC inputs)	Fault protection, monitoring, fault, temperature and trend recording
ProLogic	10 statements	
Setting Groups	1	
<b>Recording</b>		
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 differential analysis
Transient	96 s/c oscillography of all analog and external input digital channel	
Trend	3 - 60 second sample logging of MW, MVAR, I, ambient temperature and loss of life. Record trend: 30 days Trend recording up to 600 days	
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	
<b>Input &amp; Output</b>		
Analog Voltage Inputs 1 set of 3-phase voltage inputs per relay	Nominal Voltage Continuous rating over voltage Maximum over-scale thermal rating Burden	V <sub>n</sub> = 69 Vrms 2x V <sub>n</sub> = 138 Vrms 3x V <sub>n</sub> = 207 Vrms for 10 seconds <0.15 VA @ 69 Vrms
Analog Current Inputs 5 sets of 3-phase current inputs	Nominal Current Full Scale/Continuous Maximum full-scale rating Thermal Rating Burden	I <sub>n</sub> = 5 Arms 3x I <sub>n</sub> = 15 Arms 20x I <sub>n</sub> = 100 A for 1 second (no distortion) 80x I <sub>n</sub> = 400 A for 1 second <0.25 VA @ 5 Arms
Temperature Inputs - Ambient and Top Oil	2, 4-20 mA current loops	External temperature sensor can be self powered or from T-PRO relay. Unregulated 30 Vdc supply - output 40 mA @ 24 Vdc
External Inputs (digital)	9 inputs	Two options: 48-125 or 125-250 Vdc
Output (contacts)	14 programmable outputs and 1 relay inoperative output (N.C.)	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

## T-PRO 8700 Multi-function Transformer Protection & Monitoring Relay

Item	Quantity/Specs	Notes
<b>Interface &amp; Communication</b>		
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
<b>Environmental</b>		
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 1.5 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
<b>Physical</b>		
Weight	11.1 kg	25.40 lbs
Dimensions	13.3 cm (3U) high x 48.3 cm wide x 30.5 cm deep	5.25" (3U) high x 19" wide x 12" deep
Mounting	Vertical or horizontal	Specify at time of order

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