



RAIL PRODUCTS 2014 CATALOG

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**DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS
TF-RP21 (HOMOLOGATED BY RFI) AND TF-RP21NM**

**TF-RP21
TF-RP21
- NM**



PROTECTIONS

2x	overvoltage levels V_{M1} and V_{M2}
2x	undervoltage levels V_{m1} and V_{m2}
2x	max overhead line temperature T_{Ms}
4x	overcurrent forward/reverse/bidirectional programmable thresholds $I_{M1>}$, $I_{M2>}$, $I_{M3>}$, $I_{M4>}$
1x	thermal image protection of the cable/line threshold $I_{TM}1$
1x	Maximum I^2t
2x	Maximum current variation
2x	current steps with di/dt dependance thresholds I_{G1} and I_{G2}
2x	impedance monitoring with di/dt dependance thresholds R1 and R2
2x	overvoltage with 100 Hz component thresholds $V_{100}1$ and $V_{100}2$
2x	switchboard or cable earth fault protection thresholds (64)
2x	Maximum current gradient G

High speed circuit breaker diagnostic relay for :
nr. of mechanical procedures – nr. of electric openings – nr. of electric interruptions

MEASURES

Overhead line current (with sign)	Earth current
Overhead line voltage	Maximum voltage
Power	Minimum voltage
Environment temperature	Maximum current
Overhead line temperature (computed)	Maximum power

HIGH RESOLUTION COUNTERS / RECORDERS

ANALYSIS INTERVAL: 1 min / TOTAL RECORDING TIME: 3 months

Supplied energy [kWh]
Input energy [kWh]
Peak power [kW]
Maximum voltage [V]
Minimum voltage [V]
Maximum current [A]
Minimum current [A]


LOW RESOLUTION COUNTERS / RECORDERS


ANALYSIS INTERVAL: 1 hour / TOTAL RECORDING TIME: 18 months


Supplied energy [kWh]
Input energy [kWh]
Peak power [kW]
Maximum voltage [V]
Minimum voltage [V]
Maximum current [A]
Minimum current [A]
Maximum Overhead line temperature [°C]
Maximum 100 Hz value [%]




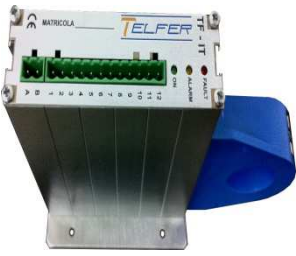
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		DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS	
		TF-RP12	TF-RP13
TF-RP1X		DC overcurrent relay 76 Reverse power relay 32 Switchboard or cable earth fault protection 64 Autodiagnostic function Oscillographic recording of events Modbus interface	DC overcurrent relay 76 Switchboard or cable earth fault protection 64 High speed circuit breaker diagnostic relay for: <ul style="list-style-type: none"> • Number of mechanical procedures • Number of electric openings • Number of electric interruptions Overhead line diagnostic relay for: <ul style="list-style-type: none"> • Thermal image protection of the cable/line • Max I²t • Max current level di/dt related Autodiagnostic function Oscillographic recording of events Modbus interface


PROBE V		VOLTAGE TRANSDUCER
		<p>Voltage transducer Redundant acquisition channel with real-time congruency check Fiber optic communication 8.1 KHz sampling rate, 16 bit A/D Range : -8000 . . + 8000 V 22 KV insulation</p>


PROBE I		CURRENT TRANSDUCER
		<p>Current transducer Redundant acquisition channel with real-time congruency check Fiber optic communication 8.1 KHz sampling rate, 16 bit A/D Range : 60mV - 80 mV shunt 22 KV insulation</p>


TFC		VOLTAGE TO CURRENT CONVERTER
		<p>Translates a 0..8 Volt signal from an Hall effect current sensor into a 4..20 mA signal.</p>

TF-IT		THERMAL IMAGE RELAY FOR LINE TEST
		<p>Measures the current flowing into a load resistor through a Hall sensor, calculates the temperature reached by the resistor and signals the trespassing of a programmable threshold. Programmable physical characteristics of the resistor. Environmental temperature sensor.</p>

TF-CONV TF-CONV-D		CURRENT AND VOLTAGE RECEIVER
		6 digit high brightness display Fiber optic receiver Triple individually programmable current outputs (-20..+20mA, -20..-4 +4..+20 mA, -12..+20 mA) Minimum voltage/current output with programmable threshold Maximum voltage/current output with programmable threshold Fully programmable on site

TF-LP-I TF-LP-V TF-LP-IV		CURRENT AND VOLTAGE TRANSDUCER
		Current(-I), Voltage (-V) and Current+Voltage (-IV) transducer Fiber optic communication (double fiber for TF-LP-IV) 8.1 KHz sampling rate 13 bits A/D Range : 60mV - 80 mV shunt on site programmable Range : -8000 . . + 8000 V 12 KV insulation (-15) or 22 KV Insulation (-40)

TF-RV		MINIMUM VOLTAGE RELAY
		8.1 kHz sampling rate 13 bits A/D Range : 0. . + 1600 V (-15) or 0..+3200 V (-30) 10 kV insulation (-15) or 20 kV Insulation (-30) 50 Volt step threshold Two watchdog outputs Three on site programmable N.E. or N.D. output contacts

ALL T.EL.FER. PRODUCTS ARE  MARKING AND MEET ALL SAFETY PROVISIONS OF THE LOW VOLTAGE DIRECTIVE N° 2006/95/CE, AND ELECTROMAGNETIC COMPABILITY DIRECTIVE N° 2004/108/CE

GENERAL CONDITIONS OF SALE ARE IN OUR DOCUMENT GEN/CGV/001