RAIL PRODUCTS CATALOG

T.EL.FER. srl

Loc. Sille, 17

38045 Civezzano (TN)

ITALY

Tel. +39 0461 1590084

E-mail info@telfer.it

www.telfer.it

TF-RP21

HOMOLOGATED BY RFI

DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS TF-RP21

PROTECTIONS	
2x	overvoltage levels V_{M1} and V_{M2}
2x	undervoltage levels V_{m1} and V_{m2}
2x	max overhead line temperature $T_{M>}$
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 (not RFI - optional)
2x	maximum current variation (not RFI - optional)
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 (not RFI - optional)
High speed circuit breaker diagnostic relay for : nr. of mechanical procedures – nr. of electric openings – nr. of electric interruptions	

REAL TIME MEASURES	
Overhead line current (with sign)	Earth current
Overhead line voltage	Current gradient
Power	Apparent impedance
Environment temperature	100 Hz value [%]
Overhead line temperature (computed)	Maximum power

COUNTERS / RECORDERS	
ANALYSIS INTERVAL: 1 min / TOTAL RECORDING TIME: 3 months	ANALYSIS INTERVAL: 1 hour / TOTAL RECORDING TIME: 18 months
Supplied energy [kWh]	Supplied energy [kWh]
Input energy [kWh]	Input energy [kWh]
Peak power [kW]	Peak power [kW]
Maximum voltage [V]	Maximum voltage [V]
Minimum voltage [V]	Minimum voltage [V]
Maximum current [A]	Maximum current [A]
Minimum current [A]	Minimum current [A]
	Maximum Overhead line temperature [°C]
	Maximum 100 Hz value [%]

COMMUNICATION PROTOCOLS
IEC 60870-5-103 over RS485 (PC_01)
Modbus over RS485 (PC_02)
Modbus over TCP-IP (PC_03)

OTHER FUNCTIONS
Autodiagnostic
Oscillographic recording of all I/O with local display of the last 10 and storage of the last 60 with 123µs resolution
Time sync through NTP protocol
Timing functions
Optional programmable IEC 61131-3 PLC

COMMUNICATION PORTS	
1x	RS232 (PC_00)
2x	RS485 (PC_01 / PC_02)
1x	Ethernet 10/100Mbps (PC_03)

POWER SUPPLY
85 . . 353V_{DC}

WEIGHT
3,6kg

TF-RP21

BIF

HOMOLOGATED BY RFI

DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS
TF-RP21-BIF (BIPOLAR FILTER)

PROTECTIONS	
3x	overvoltage levels V_{M1} ,V_{M2} , V_{filt}
3x	overcurrent forward/reverse/bidirectional programmable thresholds $I_{M1>}$, $I_{M2>}$, $I_{M3>}$
1x	Maximum current gradient G
2x	overvoltage with 100 Hz component thresholds $V_{100}1$ and $V_{100}2$
2x	switchboard or cable earth fault protection thresholds (64)

REAL TIME MEASURES	
Overhead line current (with sign)	Earth current
Overhead line voltage	Current gradient
Power	100Hz value [%]
Environment temperature	

COUNTERS / RECORDERS	
ANALYSIS INTERVAL: 1 min / TOTAL RECORDING TIME: 3 months	ANALYSIS INTERVAL: 1 hour / TOTAL RECORDING TIME: 18 months
Supplied energy [kWh]	Supplied energy [kWh]
Input energy [kWh]	Input energy [kWh]
Peak power [kW]	Peak power [kW]
Maximum voltage [V]	Maximum voltage [V]
Minimum voltage [V]	Minimum voltage [V]
Maximum current [A]	Maximum current [A]
Minimum current [A]	Minimum current [A]
	Maximum 100 Hz value [%]

COMMUNICATION PROTOCOLS
IEC 60870-5-103 over RS485 (PC_01)
Modbus over RS485 (PC_02)
Modbus over TCP-IP (PC_03)

OTHER FUNCTIONS
Autodiagnostic
Oscillographic recording of all I/O with local display of the last 10 and storage of the last 60 with 123µs resolution
Time sync through NTP protocol
Timing functions

COMMUNICATION PORTS	
1x	RS232 (PC_00)
2x	RS485 (PC_01 / PC_02)
1x	Ethernet 10/100Mbps (PC_03)

POWER SUPPLY
85 . . 353VDC

WEIGHT
3,6kg

TF-RP21

NM

DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS TF-RP21-NM (NEGATIVE AND MEASURES) WITH RECORDING CAPABILITY ON REMOVABLE MEMORY FOR VOLTAGE, CURRENT AND ENERGY WITH RESOLUTION DOWN TO 1 MILLISECOND

PROTECTION FUNCTIONS	
2x	earth overcurrent T0ccM
2x	earth overcurrent T0ccE
2x	earth overcurrent T0ccN
1x	Function 64M

REAL TIME MEASURES	
Line current (signed)	earth overcurrent T0ccM
Line voltage	earth overcurrent T0ccE
Power	earth overcurrent T0ccN

COUNTERS/RECORDERS

INTERNAL MEMORY

ANALYSIS INTERVAL: 1 min TOTAL REGISTRATION INTERVAL: 3 months	ANALYSIS INTERVAL: 1 hour TOTAL REGISTRATION INTERVAL: 18 months
Delivered enrgy [kWh]	Delivered enrgy [kWh]
Incoming energy [kWh]	Incoming energy [kWh]
Maximum power [kW]	Maximum power [kW]
Maximum voltage [V]	Maximum voltage [V]
Minimum voltage [V]	Minimum voltage [V]
Maximum current [A]	Maximum current [A]
Minimum current [A]	Minimum current [A]

REMOVABLE MEMORY

support type: USB 2.0 only with SLC tecnology

maximum capacity: 32GB (standard provisioning nr. 1 usb key 1GB SLC)

Generated file type: CSV

Adjustable sampling interval: 1 . . 10000 ms, step 1 ms

Interval 1 . . 499 ms
1 file / hour
recorded measures: voltage , current

Interval 500 . . 10000 ms
1 file / day
recorded measures: voltage , current, energy

COMUNICATION PROTOCOLS

IEC 60870-5-103 over RS485

Modbus over RS485

Modbus over TCP-IP

OTHER FUNCTIONS

Autodiagnostic

Oscillographic recording of all I/O with local display of the last 10 and storage of the last 60 with 123µs resolution

Time sync through NTP protocol

COMMUNICATION PORTS

1x	RS232 (PC_00)
2x	RS485 (PC_01 / PC_02)
1x	Ethernet 10/100Mbps (PC_03)

POWER SUPPLY

85 . . 353VDC

WEIGHT

3,6kg

TF-RP21

LR

LINE RECORDER FOR RAILWAYS

REAL TIME MEASURES
Line current (signed)
Line voltage
Power
Energy

COUNTERS/RECORDERS	
INTERNAL MEMORY	
ANALYSIS INTERVAL: 1 min **TOTAL REGISTRATION INTERVAL: 3 months**	**ANALYSIS INTERVAL: 1 hour** **TOTAL REGISTRATION INTERVAL: 18 months**
Delivered energy [kWh]	Delivered energy [kWh]
Incoming energy [kWh]	Incoming energy [kWh]
Maximum power [kW]	Maximum power [kW]
Maximum voltage [V]	Maximum voltage [V]
Minimum voltage [V]	Minimum voltage [V]
Maximum current [A]	Maximum current [A]
Minimum current [A]	Minimum current [A]

REMOVABLE MEMORY
support type: USB 2.0 only with SLC tecnology
maximum capacity: 32GB (standard provisioning nr. 1 usb key 1GB SLC)
Generated file type: CSV
Adjustable sampling interval: 1 . . 10000 ms, step 1 ms
Interval 1 . . 499 ms 1 file / hour recorded measures: voltage , current
Interval 500 . . 10000 ms 1 file / day recorded measures: voltage , current, energy

COMUNICATION PROTOCOLS
IEC 60870-5-103 over RS485
Modbus over RS485
Modbus over TCP-IP

OTHER FUNCTIONS
Autodiagnostic
Time sync through NTP protocol

COMMUNICATION PORTS	
1x	RS232 (PC_00)
2x	RS485 (PC_01 / PC_02)
1x	Ethernet 10/100Mbps (PC_03)

POWER SUPPLY
85 . . 353Vdc

WEIGHT
3,6kg

DC MULTIFUNCTION PROTECTION RELAY FOR RAILWAYS

TF-RP1X

FUNCTIONS

- Line protection against failures and overcurrents
- Measure of line voltage and current and of other relevant parameters
- Oscillographic recording of events
- Self diagnostic
- Modbus interface
- Simple user interface thanks to an intuitive set of commands and menus
- Big recording memory
- Alphanumeric display with 2 lines of 16 characters for an easy reading of values and events
- Capture of oscilloperturbographic recording of events with pre and post trigger
- Visualization of oscilloperturbographic recordings through an external PC
- Wide parametrization allows an easy adaptation to the installation requirements
- Continuous self test with remote signalling of malfunctions

INPUTS AND OUTPUTS

- 3 analog inputs 0..20 mA / 4..20 mA
- n.1 watchdog relay output for self-test, missing power supply, unconnected cable
- n. 3 relays outputs with double throw, double pole. Each relays is freely programmable for N.O. or N.C. contacts
- n. 1 power supply output (+/- 15Vcc) for external Hall effect sensor for ch. 64

COMMUNICATION PORTS AND PROTOCOLS

- n. 1 x RS485 (Modbus)
- n. 1 x RS232

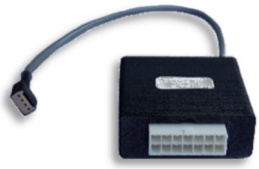
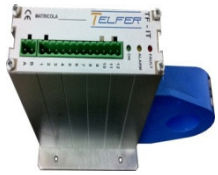
POWER SUPPLY

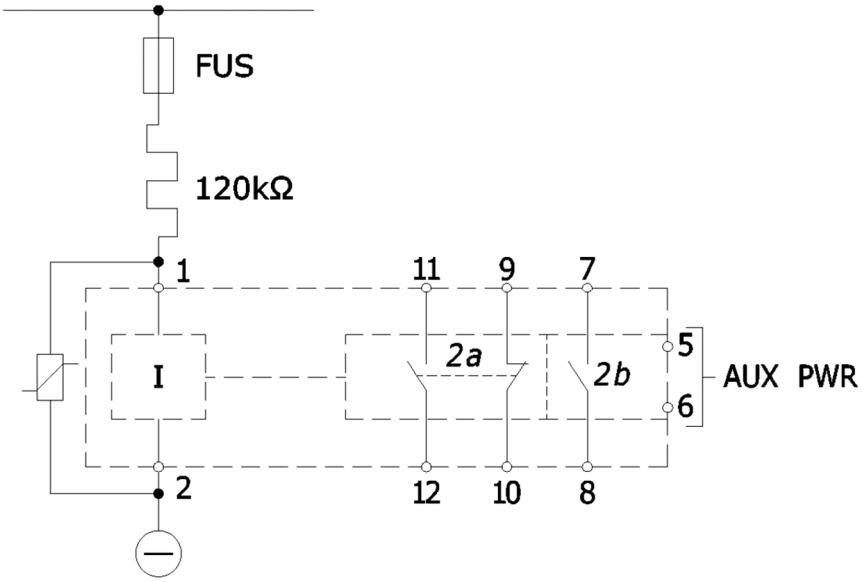
- 100 . . 353VDC

WEIGHT

- 1,1kg

DEVICE	FUNCTIONS		INPUTS
TF-RP12	76	Max current	0-20mA / 4-20mA (Function 76)
	32	Reverse current	0-20mA / 4-20mA (Function 32)
	64	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC
TF-RP13L	76	Max current	0-20mA / 4-20mA (Function 76)
	76'	Max current - 10In input	0-20mA / 4-20mA (Function 76')
	64	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC
		High speed breaker diagnostics	
		Inhibition of functions after breaker closure	
		Thermal image protection of the cable/line	
		Max current variation di/dt relate	
		Max I^2t	
TF-RP14	64	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC or TFCB
	64'	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC or TFCB
	32	Reverse current	0-20mA / 4-20mA (Function 32)
TF-RP16	76	Max current	0-20mA / 4-20mA (Function 76)
	64'	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC
	64	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC
TF-RPAL	27	Minimum Voltage	0-20mA / 4-20mA (Function 27)
	32	Reverse current	0-20mA / 4-20mA (Function 32)
	64	Switchboard/Cable earth	0-20mA / 4-20mA (Function 64). TA through TFC

PROBE V		**VOLTAGE TRANSDUCER** **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** **20 kV insulation** **Power supply: 85 . . 265VDC**
PROBE I		**CURRENT TRANSDUCER** **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** **20 kV insulation** **Power supply: 85 . . 265VDC**
TFC		**VOLTAGE TO CURRENT CONVERTER** **Translates a 0..8 Volt signal from an Hall effect current sensor into a 4..20 mA signal.** **Power supply: ±15VDC**
TF-IT		**THERMAL IMAGE RELAY FOR LINE TEST** **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.** **Environment temperature sensor** **Power supply: 100 . . 353VDC**
TF-CONV ***TF-CONV-D***		**CURRENT / VOLTAGE RECEIVERS** **Fully programmable on site with 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** **Power supply: 100 . . 353VDC** **Optional Fiber optic repeater (option -R)**
TF-LP-I W ***TF-LP-V W*** ***TF-LP-IV W***		**CURRENT, VOLTAGE AND CURRENT / VOLTAGE TRANSDUCERS** **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** **SUPPLY RANGE : Power supply: 80 . . 260V** **INSULATION: 18 kV insulation (-15) or 20 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)** **12 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** **Power supply: 85 . . 250VDC**
TF-UI 0505		**ULTRA HIGH INSULATION DC/DC CONVERTER** **1.7W DC/DC converter** **INPUT : 4,8..6,5 VDC** **OUTPUT : 5 VDC +/- 1%** **INSULATION : 25 kV AC RMS** **OPERATING TEMPERATURE : -20..+70°C**
TF-RVMM	 HOMOLOGATED BY RFI	**MINIMUM/MAXIMUM VOLTAGE RELAY** **COMPLIANT WITH RFI TE-155-1997 specs.** **On site programmable threshold 1500..3900 V_{DC}** **OPERATING TEMPERATURE : -10..+55°C** **Power supply: 85 . . 250VDC** 
TF-DCT-I ***TF-DCT-V*** ***TF-DCT-IV***	 NEW!	**8 kV VOLTAGE, CURRENT AND CURRENT / VOLTAGE TRANSDUCERS** **Current(-I), Voltage (-V) and Current + Voltage (-IV) transducer** **Fiber optic communication (double fiber for TF-DCT-IV)** **8.1 kHz sampling rate 15 bits A/D with redundant channels** **Range : 60mV - 80 mV shunt on site programmable** **Range : -8000 . . + 8000 V** **SUPPLY RANGE : Power supply: 85 . . 260V** **INSULATION: 20 kV Insulation** **SMALL SIZE: 145.9mm x 89,9mm x 85.1mm**