DTRV

The members of the DTRV product line are configured to protect and control high voltage/medium voltage transformers.

FACTORY CONFIGURATIONS FOR TRANSFORMER PROTECTION

- Transformer differential protection with usual transformer applications
- Complex transformer terminal for two or three winding transformers
- Complex transformer terminal for two or three winding transformers with voltage related functions
- Transformer tap changer controller
- Impedance protection with compounded circle charasteristics

INNOVATIVE SOLUTIONS

- Separated relay functions and communication/HMI functions in two high performance processors
- Protecta-developed code for protection functions
- Linux application for communication/HMI functions
- Short startup time for relay functions
- High-speed relay outputs for sub-cycle tripping
- Trip circuit supervision for each trip contact
- Proprietary IP rated connector for local Ethernet communication without galvanic connection
- Redundant Ethernet ports for station bus
- Parameter setting for rated input voltage and current (no HW modification is needed)
- Advanced HMI functionality by color touch-screen and embedded WEB server

COMMUNICATION

- Local HMI
  - QVGA (320 x 240) 65536 color 3.5” (optionally 5.7”) TFT display
- Contact-free front panel
  - Combined Ethernet and serial connector for communication with a connected portable computer
- Standard Ethernet
  - Peer-to-peer communication over contact-free front panel conncetion
  - RJ45 twisted pair connection to the Ethernet
  - Optical connection to the Ethernet
  - Optional RJ45 service port at front panel
- Legacy protocols
  - Serial protocols (IEC 60870-5-101/103, Modbus RTU, DNP3, ABB-SPA)
  - Network protocols (IEC 60870-5-104, DNP3, Modbus-TCP)
  - Legacy network based protocols via 100Base-FX and 10/100Base-TX (RJ45)
- IEC 61850
  - Native IEC 61850 compatibility
  - Factory default datasets
  - GSE control blocks for GOOSE publishing
- Time synchronization

TOOLS

- WEB browser (EOB and Ethernet)
- EuroCAP advanced configuration tool
- Evaluation of disturbance records

MICROENER

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DTRV – TR CONFIGURATIONS

Configurations		T2-E1	T2C-E2	T2R-E3	T3-E4	T3C-E5	T3R-E6	TR-E7	TZ-E8	TG-E9
IEC	ANSI									
I >>>	50	X	X	X	X	X	X			X
I >, I >>	51	X	X	X	X	X	X		X	X
Io >>>	50N	X	X	X	X	X	X			X
Io >, Io >>	51N	X	X	X	X	X	X		X	X
Io Dir > >, Io Dir >>	67N		X	X		X	X		X	
	87G									X
	21								X	
ΔZ/Δt	78									X
I_2 >	46	X	X	X	X	X	X	X	X	X
T >	49	X	X	X	X	X	X			X
$3I_0T$ >	87T	2w	2w	2w	3w	3w	3w			
REF	87N	X	X	X	X	X	X		X	
U >, U >>	59		X	X		X	X	X	X	X
U <, U <<	27		X	X		X	X	X	X	X
Uo >, Uo >>	59N		X	X		X	X		X	X
U_2 >	47		X	X		X	X			
f >, f >>	81O		X	X		X	X			X
f <, f <<	81U		X	X		X	X			X
df/dt	81R		X	X		X	X			X
V/Hz	24		X	X		X	X		X	X
	40									X
SYNC	25									X
	60									X
	60	X	X	X	X	X	X	X	X	X
CBFP	50BF	X	X	X	X	X	X			X
P >	32									X
P <	32									X

FUNCTIONS

- Three-phase instantaneous overcurrent protection (50)
- Three-phase time overcurrent protection (51)
- Residual instantaneous overcurrent protection (50N)
- Residual time overcurrent protection (51N)
- Residual directional overcurrent protection (67N)
- Generator differential protection (87G)
- Impedance protection (21)
- Out-of-step (78)
- Negative sequence overcurrent protection (46)
- Thermal protection (49)
- Transformer differential (87T)
- Restricted earth fault (87N)
- Definite time overvoltage protection (59)
- Definite time undervoltage protection (27)
- Residual overvoltage protection (59N)
- Negative sequence overvoltage protection (47)
- Overfrequency protection (81O)
- Underfrequency protection (81U)
- Rate of change of frequency protection (81R)
- Overexcitation (24)
- Loss of excitation (40)
- Synchrocheck (25)
- Fuse failure (VTS) (60)
- Current unbalance protection (60)
- Breaker failure protection (50BF)
- Directional overpower (32)
- Directional underpower (32)

Version	Recommended application
T2-E1	The DTRV E1 configuration measures three phase currents and the zero sequence current component from both sides of a two winding, three-phase transformer. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Also a thermal replica protection function is included.
T2C-E2	The DTRV E2 configuration measures three phase currents, the zero sequence current component from both sides of a two winding, three-phase transformer and additionally three phase voltages and the zero sequence voltage component. These measurements allow, in addition to the current- and voltage-based functions, directionality extension of the residual overcurrent function. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Based on the voltage measurement also the frequency is evaluated to realize frequency-based protection functions. Also a thermal replica protection function is included.
T2R-E3	The DTRV E3 configuration measures three phase currents, the zero sequence current component from both sides of a two winding, three-phase transformer and additionally three phase voltages and the zero sequence voltage component. These measurements allow, in addition to the current- and voltage-based functions, directionality extension of the residual overcurrent function. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Based on the voltage measurement also the frequency is evaluated to realize frequency-based protection functions. Also a thermal replica protection function is included. This configuration is extended also with tap-changer controller function.
T3-E4	The DTRV E4 configuration measures three phase currents and the zero sequence current component from all three sides of a three winding, three-phase transformer. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Also a thermal replica protection function is included.
T3C-E5	The DTRV E5 configuration measures three phase currents, the zero sequence current component from all three sides of a three winding, three-phase transformer and additionally three phase voltages and the zero sequence voltage component. These measurements allow, in addition to the current- and voltage-based functions, directionality extension of the residual overcurrent function. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Based on the voltage measurement also the frequency is evaluated to realize frequency-based protection functions. Also a thermal replica protection function is included.
T3R-E6	The DTRV E6 configuration measures three phase currents, the zero sequence current component from all three sides of a three winding, three-phase transformer and additionally three phase voltages and the zero sequence voltage component. These measurements allow, in addition to the current- and voltage-based functions, directionality extension of the residual overcurrent function. The main protection functions are transformer differential protection and restricted earth-fault protection functions. Based on the voltage measurement also the frequency is evaluated to realize frequency-based protection functions. Also a thermal replica protection function is included. This configuration is extended also with tap-changer controller function.
TR-E7	The DTRV E7 configuration is designed to perform the transformer tap-changer controller function. It measures three phase currents component and additionally three phase voltages component from both sides of the transformer. The tap-changer controller function considers also the voltage drop of serial network elements and the healthy state of the supplying high voltage network. Also the voltage limitation functions are included. Option to control parallel transformers is also available.
TZ-E8	The DTRV E8 configuration measures three phase currents and the zero sequence current component and additionally three phase voltages and the zero sequence voltage component. These measurements allow, in addition to the current- and voltage-based functions, directionality extension of the residual overcurrent function. The main protection function in this configuration is the impedance protection function with compounded circular characteristics.
TG-E9	The DTRV E9 configuration is designed to protect generators in the 2.5 MVA to 50 MVA power range. The device includes all generator protection function which are based on voltage and current measurement. Only the protection functions which need additional high voltage elements, like injectors, are excluded from the range of the functions.