



ESDR 4/4T

Current Differential Protection Relay

APPLICATIONS

The ESDR 4/4T offers a three-phase current differential protection for generators, motors, and transformers that are interconnected. Two different versions offer a maximum of flexibility and protection for your equipment. These are:

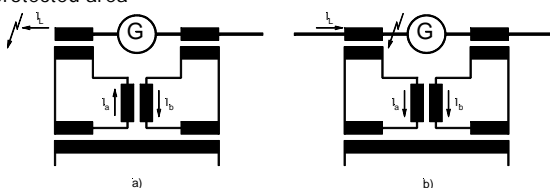
- **ESDR 4** - Current differential protection for generators and motors.
- **ESDR 4T** - Current differential protection for generators, motors, and transformers in unit connection.

The current flowing in the individual conductors is measured by means of current transformers installed on both sides of the protection zone. These transformers form the limits of the protection zone. Any two-phase or three-phase short circuits and ground faults are recognized by the ESDR 4/4T as fault currents. By means of freely configurable relays, the unit will indicate if any of the adjusted fault current limits have been exceeded. In the event that fault currents occur outside of the protection zone, the unit does not cause an opening operation. Hence the unit can be used in protection systems requiring selective tripping operations.

To adapt the network configuration to the ESDR 4T it is possible to change the phase shift of the transformer via selecting the vector group in the display. The different nominal currents of the high and low voltage side of the transformer as well as the transformer ratio may be configured. Every measuring point may be set separately. These features permit the ESDR 4T to be universal in its applications.

The ESDR 4/4T permits design simplification of the switchgear cabinet, facilitates the commissioning, ensures the operation of the system, is user friendly, and increases the availability of the system.

Principle: fault a) outside [=no alarm] b) inside [=alarm] of the protected area



DESCRIPTION (continued)

Features

- True RMS 6× current measurement, 3phase system on both sides of the protected zone
- Secondary current transformer output available as ..1 A or ..5 A
- Configurable trip set points for
 - differential current (I_d)
 - stabilizing current (I_s)
- Configurable delays
- 4 alarm relays
- 3 discrete inputs (for blocking, acknowledgment, and configuration)
- Two-line LC display

ESDR 4 (unique features)

Current differential protection relay for motors and generators.

- Configurable tripping characteristic
- Configurable independent tripping values for
 - differential current protection (I_d)
 - stabilizing current protection (I_s)

ESDR 4T (unique features)

Current differential protection relay for motors, generators, and transformers that are interconnected.

- Configurable tripping characteristic
- Configurable independent tripping values for
 - differential current protection (I_d)
 - stabilizing current protection (I_s)
- Configurable transformer ratio
- Configurable vector group
- Transformer inrush detection/suppression
- Individual configuration of the nominal current for the high and low voltage side of the transformer
- Configurable transformer ratio separated for currents of high and low voltage side of the transformer

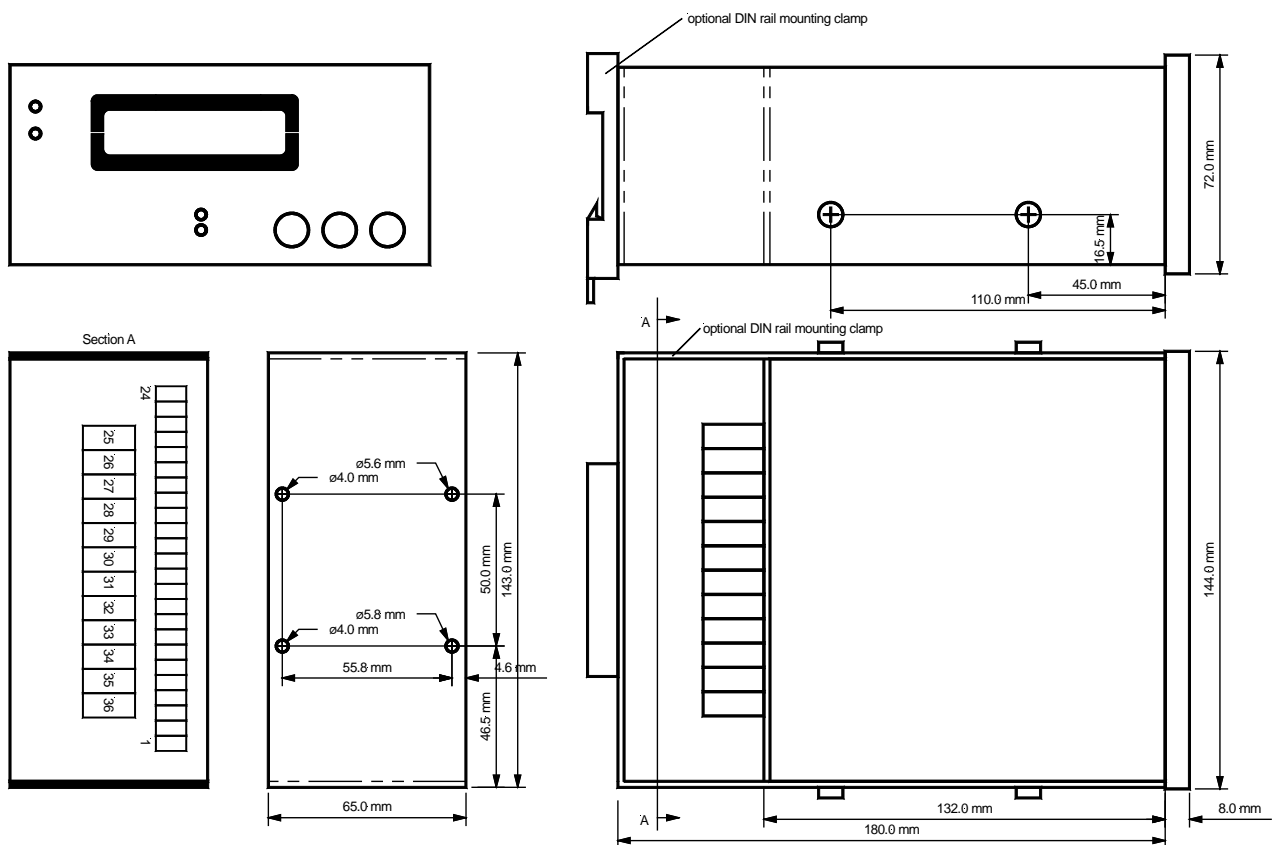
- Generator, motor, and transformer (which are interconnected) current differential protection relay into one single digital unit
- True RMS sensing
- Discrete inputs for remote control via external PLC
- Alarm relay outputs
- Front panel configurable
- Microprocessor technology for accurate, repeatable, and reliable operation
- Programmable threshold set points with individual time delays
- Configurable transformer ratio and vector group (only ESDR4T)
- Transformer inrush detection
- Front panel or DIN rail mounting
- CE marked
- UL/cUL Listed
- GL Approval (only ESDR4T)

SPECIFICATIONS

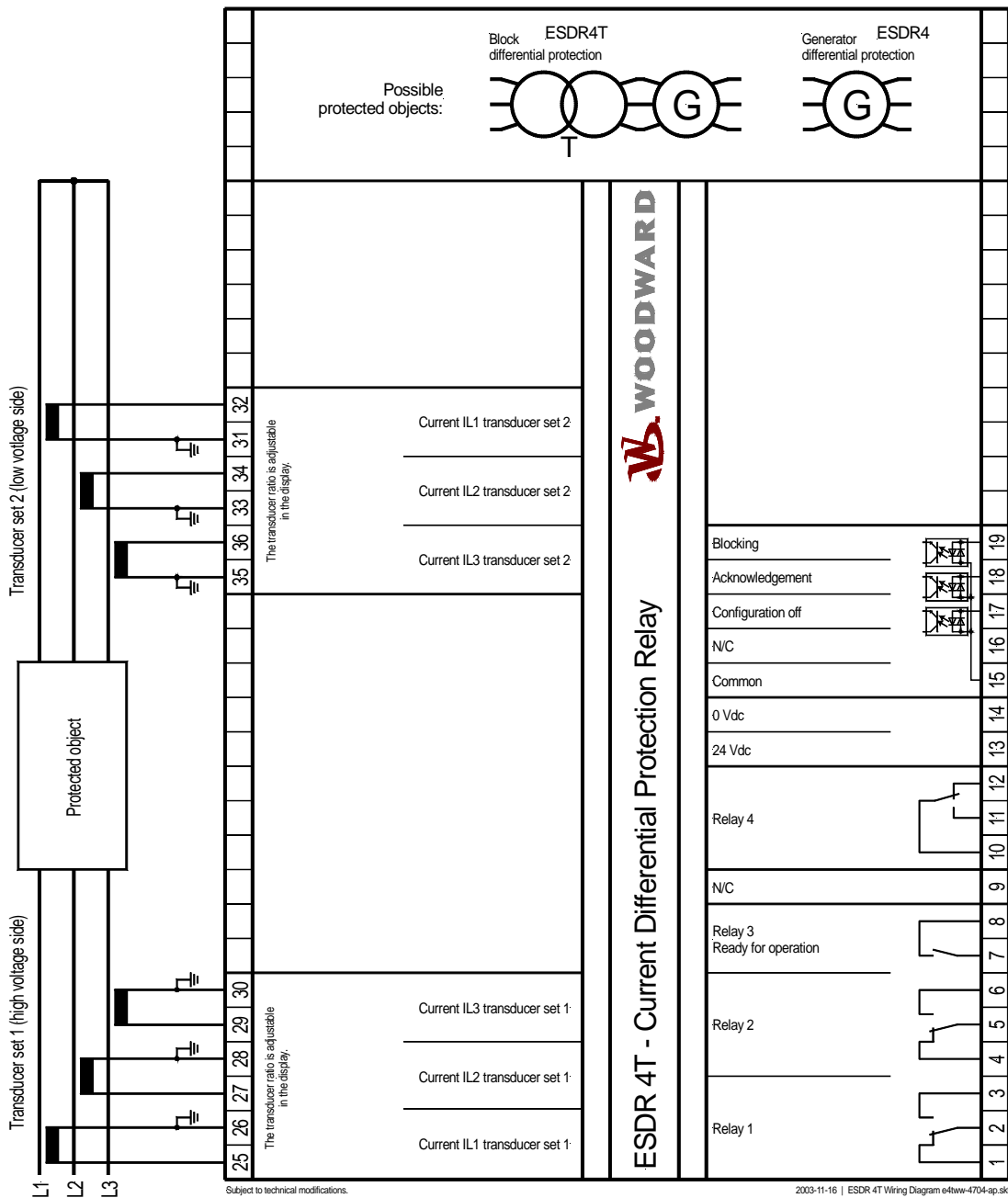
Accuracy Class 1
 Power supply 24 Vdc (+/-25 %)
 Intrinsic consumption max. 6 W
 Ambient temperature Storage.....-40 to 85 °C (-40 to 185 °F)
 Operation.....-20 to 70 °C (-4 to 158 °F)
 Ambient humidity..... 95 %, non-condensing
Current isolated
 Rated current (I_{rated}) [1] ..1 A or [5] ..15 A
 Current carrying capacity $5.0 \times I_{rated}$
 Load $< 0.15 \text{ VA}$
 Rated short-time current (1 s) [..1] $100.0 \times I_{rated}$, [..5] $30.0 \times I_{rated}$
Discrete inputs isolated
 Input range 18 to 250 Vac/dc
 Input resistance approx. 68 k Ω

Relay outputs potential free
 Contact material AgCdO
 Load (GP) 24 Vdc@2 Adc, 250 Vac@2 Aac
 Pilot duty (PD) 24 Vdc@1 Adc
Housing Type APRANORM DIN 43 700
 Dimensions 144x72x199 mm
 Front cutout 138[+1.0] x 68[+0.7] mm
 Connection screw/plug terminals depending on connector 2.5 mm² (14AWG) or 4 mm² (12AWG)
 Front insulating surface
 Protection system..... IP42 from front (IP21 from back)
 Weight approx. 1,000 g
Disturbance test (CE)..... tested according to applicable EN guidelines
Listings UL/cUL listed for ordinary locations
Approvals..... GL (Germanischer Lloyd) only ESDR4T

DIMENSIONS



WIRING DIAGRAM (ESDR4T)



TRANSFORMER VECTOR GROUPS (ESDR4T)

Vector group	
Yd5	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $5 \times 30^\circ = 150^\circ$
Yy0	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, 0°
Dy5	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $5 \times 30^\circ = 150^\circ$
Dd0	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, 0°
Yz5	HV: Δ -circuit arrangement, LV: Z-circuit arrangement, $5 \times 30^\circ = 150^\circ$
Dz0	HV: Δ -circuit arrangement, LV: Z-circuit arrangement, 0°
Yd11	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $11 \times 30^\circ = 330^\circ$
Yy6	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $6 \times 30^\circ = 180^\circ$
Dy11	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $11 \times 30^\circ = 330^\circ$
Dd6	HV: Δ -circuit arrangement, LV: Δ -circuit arrangement, $6 \times 30^\circ = 180^\circ$
Yz11	HV: Δ -circuit arrangement, LV: Z-circuit arrangement, $11 \times 30^\circ = 330^\circ$
Dz6	HV: Δ -circuit arrangement, LV: Z-circuit arrangement, $6 \times 30^\circ = 180^\circ$

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03250B - 05/1/S

PRODUCT NUMBERS (P/N)

ESDR 4 - Product number (P/N)

front panel mount ../1 A = LR20459 (ESDR401B)
 DIN rail mount ../1 A = 8441-1105 (ESDR401M)
 front panel mount ../5 A = 8441-1010 (ESDR405B)
 DIN rail mount ../5 A = LR20590 (ESDR405M)
 Optional DIN rail clamps for mounting a front panel version onto a DIN rail: P/N LR05188

ESDR 4T - Product number (P/N)

front panel m. ../1 A = LR20021 (ESDR4T01B)
 DIN rail mount ../1 A = LR20616 (ESDR4T01M)
 front panel m. ../5 A = 5448-897 (ESDR4T05B)
 DIN rail mount ../5 A = 8441-1047 (ESDR4T05M)

TRIPPING CHARACTERISTIC

