MicroEner

LINE M

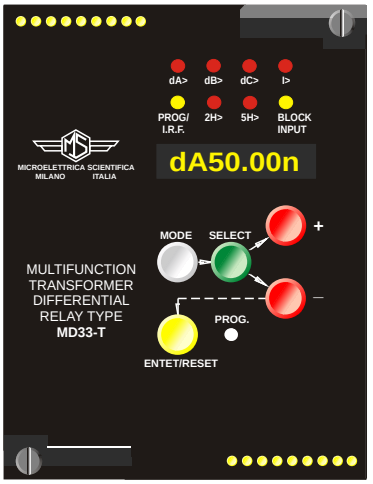
MD33-T

NC. N26-R2A

PERCENTAGE BIASED DIFFERENTIAL RELAY FOR 3-WINDING TRANSFORMERS

50/51, 87

- **Three-phase percentage biased differential relay for three-winding transformers**
- **Two differential current levels**
- **One overcurrent level**
- **2nd and 5th harmonic adjustable restraint levels**
- **Programmable percentage bias curve**
- **Oscillographic recording**
- **Modbus Communication Protocol**
- **UL / CSA listed**



Three-phase percentage biased differential relay for 3 winding transformers with two or three power sources.

The relay measures the incoming currents and operates the CT ratio and vector group compensation with one set only the of interposing C.Ts.

Real Time Measurements	**=** I_{dA}-I_{dB}-I_{dC}-I_{do} - I_{1A}-I_{1B}-I_{1C} - I_{2A}-I_{2B}-I_{2C} - I_{dIIA}-I_{dIIB}-I_{dIIC} - I_{dVA}-I_{dVB}-I_{dVC}
Maximum Demand and Inrush Recording	**=** I_{dA}-I_{dB}-I_{dC}-I_{do} - I_{1A}-I_{1B}-I_{1C} - I_{2A}-I_{2B}-I_{2C} - I_{dIIA}-I_{dIIB}-I_{dIIC} - I_{dVA}-I_{dVB}-I_{dVC}

Programmable Input Quantities

Fn = System frequency : (50 - 60)Hz
1In = Rated primary current of phase CTs HV side : (1 - 9999) A, step 1A
2In = Rated primary current of phase CTs LV side : (1 - 9999) A, step 1A
1V = Rated primary voltage of Transformer HV side : (0.2 - 380)kV, step 0.01kV
2V = Rated primary voltage of Transformer LV side : (0.2 - 380)kV, step 0.01kV
a = Selection of Transformer's vector group.

1 - F87T : Low-set Phase Differential

- Trip level : **d> = (0.1 - 0.5)In**, step 0.01In
- Trip time : £ **0.03s**
- Bias percentage : **R = (10 - 50)%,** step 1%
- 2nd Harmonic restraint level : **2H = (0.1 - 0.3)Id,** step 0.01Id
- 5th Harmonic restraint level : **5H = (0.2 - 0.4)Id,** step 0.01Id
- Time during which harmonic restraint level can be lowered at transformer energisation: **tH = (0.01 - 90.00)s,** step 0.01s
- 2nd Harmonic restraint level reduction during tH : **R2H = (0.5 - 1)2H**, step 0.01
- 5th Harmonic restraint level reduction during tH : **R5H = (0.5 - 1)5H**, step 0.01

2 - F87T : High-set Phase Differential

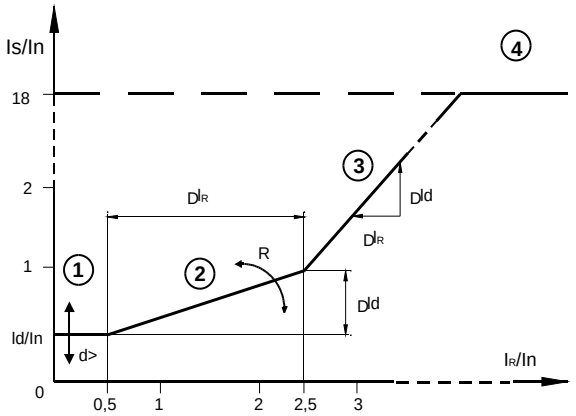
- Trip level : **d>> = (2 - 17)In**, step 0.01In
- Detection time : **6ms < t < 20ms**
- Peak current detection with DC offset restraint.

F50/51 (I>): Overcurrent Protection

- Current setting range : **I> = (0.5 - 20)In**, step 0.1In
- Instantaneous output : £ **0.03s**
- Trip time delayed : **tI> = (0.05 - 30)s**, step 0.01s

Digital Inputs

- **B1** = Operation block input
- **B2** = Harmonic restraint's reduction
- **B3** = Oscillographic record external trigger



Is= Effective relay's operation differential current
Id= Relay set differential current = [d>]
IR= Relay's through current

$$R\% = 100\,\frac{DI_d}{DI_R} = 100\,\frac{D(I_1 - I_2)}{D(I_1 + I_2) : 2}$$

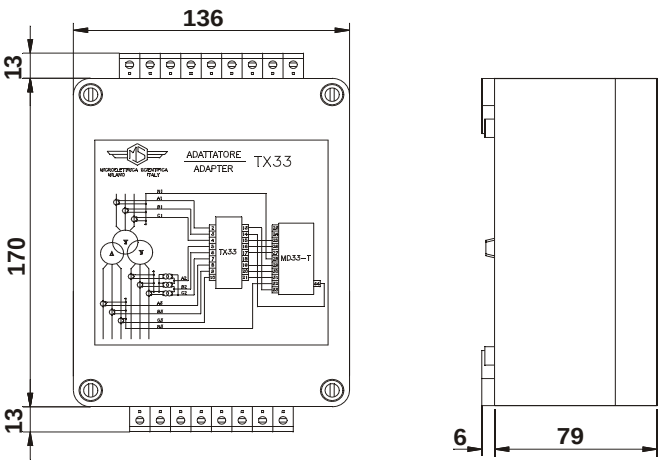
① $\frac{Is}{In} = \frac{I_d}{In}$

② $\frac{Is}{In} = \frac{I_d}{In} + (\frac{I_R}{In} - 0{,}5) \times \frac{R\%}{100}$

③ $\frac{Is}{In} = \frac{I_d}{In} + \frac{2R\%}{100} + (\frac{I_R}{In} - 2{,}5)$

④ $\frac{Is}{In}$ @18

TX33 - OVERALL DIMENSIONS



Connexion Diagram