Open Conductor Fault Formulas

List of 46 Open Conductor Fault Formulas

Open Conductor Fault

One Conductor Open

1) A-Phase EMF using Positive Sequence Voltage (One Conductor Open)

fx $E_{a(oco)} = V_{1(oco)} + I_{1(oco)} \cdot Z_{1(oco)}$

Open Calculator

ex $29.38794\text{V} = 13.5\text{V} + 2.001\text{A} \cdot 7.94\Omega$

2) A-Phase EMF using Zero Sequence Impedance (One Conductor Open)

fx $E_{a(oco)} = I_{1(oco)} \cdot \left(Z_{1(oco)} + \left(\frac{Z_{0(oco)} \cdot Z_{2(oco)}}{Z_{0(oco)} + Z_{2(oco)}} \right) \right)$

Open Calculator

ex $29.46126\text{V} = 2.001\text{A} \cdot \left(7.94\Omega + \left(\frac{8\Omega \cdot 44.6\Omega}{8\Omega + 44.6\Omega} \right) \right)$

3) B-Phase Current (One Conductor Open)

fx $I_{b(oco)} = 3 \cdot I_{0(oco)} - I_{c(oco)}$

Open Calculator

ex $2.7\text{A} = 3 \cdot 2.20\text{A} - 3.9\text{A}$

4) C-Phase Current (One Conductor Open)

fx $I_{c(oco)} = 3 \cdot I_{0(oco)} - I_{b(oco)}$

Open Calculator

ex $3.9\text{A} = 3 \cdot 2.20\text{A} - 2.7\text{A}$

5) Potential Difference between A-Phase and Neutral (One Conductor Open)

fx $V_{a(oco)} = V_{0(oco)} + V_{1(oco)} + V_{2(oco)}$

Open Calculator

ex $11.956\text{V} = \text{-}17.6\text{V} + 13.5\text{V} + 16.056\text{V}$

6) Potential Difference between A-Phase using Zero Sequence Potential Difference (One Conductor Open)

Open Calculator

fx $$\mathrm{Vaa'}_{(oco)} = \frac{\mathrm{Vaa'}_{0(oco)}}{3}$$

ex $$1.223333\mathrm{V} = \frac{3.67\mathrm{V}}{3}$$

Negative Sequence

7) Negative Sequence Current using Negative Sequence Impedance (One Conductor Open)

Open Calculator

fx $$\mathrm{I}_{2(oco)} = -\frac{\mathrm{V}_{2(oco)}}{\mathrm{Z}_{2(oco)}}$$

ex $$-0.36\mathrm{A} = -\frac{16.056\mathrm{V}}{44.6\Omega}$$

8) Negative Sequence Potential Difference using A-Phase Current (One Conductor Open)

fx

Open Calculator

$$\mathrm{Vaa'}_{2(oco)} = \mathrm{I}_{a(oco)} \cdot \left(\frac{\mathrm{Z}_{0(oco)} \cdot \mathrm{Z}_{1(oco)} \cdot \mathrm{Z}_{2(oco)}}{\left(\mathrm{Z}_{0(oco)} \cdot \mathrm{Z}_{1(oco)}\right) + \left(\mathrm{Z}_{1(oco)} \cdot \mathrm{Z}_{2(oco)}\right) + \left(\mathrm{Z}_{2(oco)} \cdot \mathrm{Z}_{0(oco)}\right)} \right)$$

ex $$7.791749\mathrm{V} = 2.13\mathrm{A} \cdot \left(\frac{8\Omega \cdot 7.94\Omega \cdot 44.6\Omega}{(8\Omega \cdot 7.94\Omega) + (7.94\Omega \cdot 44.6\Omega) + (44.6\Omega \cdot 8\Omega)} \right)$$

9) Negative Sequence Voltage using Negative Sequence Impedance (One Conductor Open)

Open Calculator

fx $$\mathrm{V}_{2(oco)} = -\mathrm{Z}_{2(oco)} \cdot \mathrm{I}_{2(oco)}$$

ex $$16.056\mathrm{V} = -44.6\Omega \cdot \text{-}0.36\mathrm{A}$$

Positive Sequence

10) Positive Sequence Current using Positive Sequence Voltage (One Conductor Open)

Open Calculator

fx $$I_{1(oco)} = \frac{E_{a(oco)} - V_{1(oco)}}{Z_{1(oco)}}$$

ex $$2A = \frac{29.38V - 13.5V}{7.94\Omega}$$

11) Positive Sequence Current using Zero Sequence Impedance (One Conductor Open)

Open Calculator

fx $$I_{1(oco)} = \frac{E_{a(oco)}}{Z_{1(oco)} + \left(\frac{Z_{0(oco)} \cdot Z_{2(oco)}}{Z_{0(oco)} + Z_{2(oco)}}\right)}$$

ex $$1.995481A = \frac{29.38V}{7.94\Omega + \left(\frac{8\Omega \cdot 44.6\Omega}{8\Omega + 44.6\Omega}\right)}$$

12) Positive Sequence Impedance using Positive Sequence Voltage (One Conductor Open)

Open Calculator

fx $$Z_{1(oco)} = \frac{E_{a(oco)} - V_{1(oco)}}{I_{1(oco)}}$$

ex $$7.936032\Omega = \frac{29.38V - 13.5V}{2.001A}$$

13) Positive Sequence Potential Difference using A-Phase Potential Difference (One Conductor Open)

Open Calculator

fx $$Vaa'_{1(oco)} = \frac{Vaa'_{(oco)}}{3}$$

ex $$0.406667V = \frac{1.22V}{3}$$

14) Positive Sequence Voltage using Positive Sequence Impedance (One Conductor Open)

Open Calculator

fx $$V_{1(oco)} = E_{a(oco)} - I_{1(oco)} \cdot Z_{1(oco)}$$

ex $$13.49206V = 29.38V - 2.001A \cdot 7.94\Omega$$

Zero Sequence

15) Zero Sequence Current (One Conductor Open)

Open Calculator

fx $$I_{0(oco)} = \frac{I_{b(oco)} + I_{c(oco)}}{3}$$

ex $$2.2\text{A} = \frac{2.7\text{A} + 3.9\text{A}}{3}$$

16) Zero Sequence Current using Zero Sequence Voltage (One Conductor Open)

Open Calculator

fx $$I_{0(oco)} = (-1) \cdot \frac{V_{0(oco)}}{Z_{0(oco)}}$$

ex $$2.2\text{A} = (-1) \cdot \frac{-17.6\text{V}}{8\Omega}$$

17) Zero Sequence Impedance using Zero Sequence Voltage (One Conductor Open)

Open Calculator

fx $$Z_{0(oco)} = (-1) \cdot \frac{V_{0(oco)}}{I_{0(oco)}}$$

ex $$8\Omega = (-1) \cdot \frac{-17.6\text{V}}{2.20\text{A}}$$

18) Zero Sequence Voltage using Zero Sequence Impedance (One Conductor Open)

Open Calculator

fx $$V_{0(oco)} = -Z_{0(oco)} \cdot I_{0(oco)}$$

ex $$-17.6\text{V} = -8\Omega \cdot 2.20\text{A}$$

Three Conductor Open

19) Potential Difference between A-Phase (Three Conductor Open)

Open Calculator

fx $$Vaa'_{(thco)} = 3 \cdot Vaa'_{0(thco)} - Vbb'_{(thco)} - Vcc'_{(thco)}$$

ex $$5.19\text{V} = 3 \cdot 3.68\text{V} - 2.96\text{V} - 2.89\text{V}$$

20) Potential Difference between B-Phase (Three Conductor Open)

Open Calculator

$$Vbb'_{(thco)} = \left(3 \cdot Vaa'_{0(thco)}\right) - Vaa'_{(thco)} - Vcc'_{(thco)}$$

ex $2.96V = (3 \cdot 3.68V) - 5.19V - 2.89V$

21) Potential Difference between C-Phase (Three Conductor Open)

Open Calculator

$$Vcc'_{(thco)} = \left(3 \cdot Vaa'_{0(thco)}\right) - Vaa'_{(thco)} - Vbb'_{(thco)}$$

ex $2.89V = (3 \cdot 3.68V) - 5.19V - 2.96V$

22) Zero Sequence Potential Differences (Three Conductor Open)

Open Calculator

$$Vaa'_{0(thco)} = \frac{Vaa'_{(thco)} + Vbb'_{(thco)} + Vcc'_{(thco)}}{3}$$

ex $3.68V = \frac{5.19V + 2.96V + 2.89V}{3}$

Two Conductor Open

23) A-Phase Current (Two Conductor Open)

Open Calculator

$$I_{a(tco)} = I_{1(tco)} + I_{2(tco)} + I_{0(tco)}$$

ex $4.84A = 2.01A + 0.64A + 2.19A$

24) A-Phase EMF using Positive Sequence Current (Two Conductor Open)

Open Calculator

$$E_{a(tco)} = I_{1(tco)} \cdot \left(Z_{1(tco)} + Z_{2(tco)} + Z_{0(tco)}\right)$$

ex $121.4241V = 2.01A \cdot (7.95\Omega + 44.5\Omega + 7.96\Omega)$

25) A-Phase EMF using Positive Sequence Voltage (Two Conductor Open)

Open Calculator

$$E_{a(tco)} = V_{1(tco)} + I_{1(tco)} \cdot Z_{1(tco)}$$

ex $120.9795V = 105V + 2.01A \cdot 7.95\Omega$

26) A-Phase Voltage using Sequence Voltages (Two Conductor Open)

Open Calculator

fx $$V_{a(tco)} = V_{1(tco)} + V_{2(tco)} + V_{0(tco)}$$

ex $$59.02V = 105V + -28.48V + -17.5V$$

27) Potential Difference between B-Phase (Two Conductor Open)

Open Calculator

fx $$Vbb'_{(tco)} = 3 \cdot Vaa'_{0(tco)} - Vcc'_{(tco)}$$

ex $$8.1V = 3 \cdot 3.66V - 2.88V$$

28) Potential Difference between C-Phase (Two Conductor Open)

Open Calculator

fx $$Vcc'_{(tco)} = \left(3 \cdot Vaa'_{0(tco)}\right) - Vbb'_{(tco)}$$

ex $$2.88V = (3 \cdot 3.66V) - 8.1V$$

Negative Sequence

29) Negative Sequence Current using A-Phase Current(Two Conductor Open)

Open Calculator

fx $$I_{2(tco)} = I_{a(tco)} \cdot \left(\frac{Z_{1(tco)}}{Z_{0(tco)} + Z_{1(tco)} + Z_{2(tco)}}\right)$$

ex $$0.636948A = 4.84A \cdot \left(\frac{7.95\Omega}{7.96\Omega + 7.95\Omega + 44.5\Omega}\right)$$

30) Negative Sequence Current using Negative Sequence Voltage (Two Conductor Open)

Open Calculator

fx $$I_{2(tco)} = -\frac{V_{2(tco)}}{Z_{2(tco)}}$$

ex $$0.64A = -\frac{-28.48V}{44.5\Omega}$$

31) Negative Sequence Potential Difference (Two Conductor Open)

Open Calculator

fx $$Vaa'_{2(tco)} = \left((-1) \cdot Vaa'_{1(tco)} - Vaa'_{0(tco)}\right)$$

ex $$-7.11V = ((-1) \cdot 3.45V - 3.66V)$$

32) Negative Sequence Voltage using A-Phase Current(Two Conductor Open)

Open Calculator

fx $$V_{2(tco)} = -I_{a(tco)} \cdot \left(\frac{Z_{1(tco)} \cdot Z_{2(tco)}}{Z_{0(tco)} + Z_{1(tco)} + Z_{2(tco)}} \right)$$

ex $$-28.344165V = -4.84A \cdot \left(\frac{7.95\Omega \cdot 44.5\Omega}{7.96\Omega + 7.95\Omega + 44.5\Omega} \right)$$

33) Negative Sequence Voltage using Negative Sequence Current (Two Conductor Open)

Open Calculator

fx $$V_{2(tco)} = -\left(I_{2(tco)} \cdot Z_{2(tco)}\right)$$

ex $$-28.48V = -(0.64A \cdot 44.5\Omega)$$

Positive Sequence

34) Positive Sequence Current (Two Conductor Open)

Open Calculator

fx $$I_{1(tco)} = \frac{I_{a(tco)}}{3}$$

ex $$1.613333A = \frac{4.84A}{3}$$

35) Positive Sequence Current using A-Phase EMF (Two Conductor Open)

Open Calculator

fx $$I_{1(tco)} = \frac{E_{a(tco)}}{Z_{0(tco)} + Z_{1(tco)} + Z_{2(tco)}}$$

ex $$2.00927A = \frac{121.38V}{7.96\Omega + 7.95\Omega + 44.5\Omega}$$

36) Positive Sequence Current using Positive Sequence Voltage (Two Conductor Open)

Open Calculator

fx $$I_{1(tco)} = \frac{E_{a(tco)} - V_{1(tco)}}{Z_{1(tco)}}$$

ex $$2.060377A = \frac{121.38V - 105V}{7.95\Omega}$$

37) Positive Sequence Impedance using A-Phase EMF (Two Conductor Open)

Open Calculator

fx $$Z_{1(tco)} = \left(\frac{E_{a(tco)}}{I_{1(tco)}}\right) - Z_{0(tco)} - Z_{2(tco)}$$

ex $$7.92806\Omega = \left(\frac{121.38V}{2.01A}\right) - 7.96\Omega - 44.5\Omega$$

38) Positive Sequence Impedance using Positive Sequence Voltage (Two Conductor Open)

Open Calculator

fx $$Z_{1(tco)} = \frac{E_{a(tco)} - V_{1(tco)}}{I_{1(tco)}}$$

ex $$8.149254\Omega = \frac{121.38V - 105V}{2.01A}$$

39) Positive Sequence Potential Difference (Two Conductor Open)

Open Calculator

fx $$Vaa'_{1(tco)} = \left((-1) \cdot Vaa'_{2(tco)}\right) - Vaa'_{0(tco)}$$

ex $$3.45V = ((-1) \cdot \text{-}7.11V) - 3.66V$$

40) Positive Sequence Voltage using Positive Sequence Current (Two Conductor Open)

Open Calculator

fx $$V_{1(tco)} = E_{a(tco)} - I_{1(tco)} \cdot Z_{1(tco)}$$

ex $$105.4005V = 121.38V - 2.01A \cdot 7.95\Omega$$

Zero Sequence

41) Zero Sequence Current using A-Phase Current(Two Conductor Open)

Open Calculator

fx $$I_{0(tco)} = I_{a(tco)} \cdot \left(\frac{Z_{1(tco)}}{Z_{0(tco)} + Z_{1(tco)} + Z_{2(tco)}}\right)$$

ex $$0.636948A = 4.84A \cdot \left(\frac{7.95\Omega}{7.96\Omega + 7.95\Omega + 44.5\Omega}\right)$$

42) Zero Sequence Current using Zero Sequence Voltage (Two Conductor Open)

Open Calculator

$$I_{0(tco)} = (-1) \cdot \frac{V_{0(tco)}}{Z_{0(tco)}}$$

$$2.198492\text{A} = (-1) \cdot \frac{-17.5\text{V}}{7.96\Omega}$$

43) Zero Sequence Impedance using Zero Sequence Voltage (Two Conductor Open)

Open Calculator

$$Z_{0(tco)} = (-1) \cdot \frac{V_{0(tco)}}{I_{0(tco)}}$$

$$7.990868\Omega = (-1) \cdot \frac{-17.5\text{V}}{2.19\text{A}}$$

44) Zero Sequence Potential Difference (Two Conductor Open)

Open Calculator

$$Vaa'_{0(tco)} = \left((-1) \cdot Vaa'_{1(tco)}\right) - \left(Vaa'_{2(tco)}\right)$$

$$3.66\text{V} = ((-1) \cdot 3.45\text{V}) - (-7.11\text{V})$$

45) Zero Sequence Potential Difference using Potential Difference between B-Phase(Two Conductor Open)

Open Calculator

$$Vaa'_{0(tco)} = \frac{Vbb'_{(tco)} + Vcc'_{(tco)}}{3}$$

$$3.66\text{V} = \frac{8.1\text{V} + 2.88\text{V}}{3}$$

46) Zero Sequence Voltage using Zero Sequence Current (Two Conductor Open)

Open Calculator

$$V_{0(tco)} = (-1) \cdot I_{0(tco)} \cdot Z_{0(tco)}$$

$$-17.4324\text{V} = (-1) \cdot 2.19\text{A} \cdot 7.96\Omega$$

Variables Used

- $E_{a(oco)}$ A Phase EMF in OCO *(Volt)*
- $E_{a(tco)}$ A Phase EMF in TCO *(Volt)*
- $I_{0(oco)}$ Zero Sequence Current in OCO *(Ampere)*
- $I_{0(tco)}$ Zero Sequence Current in TCO *(Ampere)*
- $I_{1(oco)}$ Positive Sequence Current in OCO *(Ampere)*
- $I_{1(tco)}$ Positive Sequence Current in TCO *(Ampere)*
- $I_{2(oco)}$ Negative Sequence Current in OCO *(Ampere)*
- $I_{2(tco)}$ Negative Sequence Current in TCO *(Ampere)*
- $I_{a(oco)}$ A-Phase Current in OCO *(Ampere)*
- $I_{a(tco)}$ A-Phase Current in TCO *(Ampere)*
- $I_{b(oco)}$ B Phase Current in OCO *(Ampere)*
- $I_{c(oco)}$ C Phase Current in OCO *(Ampere)*
- $V_{0(oco)}$ Zero Sequence Voltage in OCO *(Volt)*
- $V_{0(tco)}$ Zero Sequence Voltage in TCO *(Volt)*
- $V_{1(oco)}$ Positive Sequence Voltage in OCO *(Volt)*
- $V_{1(tco)}$ Positive Sequence Voltage in TCO *(Volt)*
- $V_{2(oco)}$ Negative Sequence Voltage in OCO *(Volt)*
- $V_{2(tco)}$ Negative Sequence Voltage in TCO *(Volt)*
- $V_{a(oco)}$ A Phase Voltage in OCO *(Volt)*
- $V_{a(tco)}$ A Phase Voltage in TCO *(Volt)*
- $Vaa'_{(oco)}$ Potential Difference Between A Phase in OCO *(Volt)*
- $Vaa'_{(thco)}$ Potential Difference Between A Phase in THCO *(Volt)*
- $Vaa'_{0(oco)}$ Zero Sequence Potential Difference in OCO *(Volt)*
- $Vaa'_{0(tco)}$ Zero Sequence Potential Difference in TCO *(Volt)*
- $Vaa'_{0(thco)}$ Zero Sequence Potential Difference in THCO *(Volt)*
- $Vaa'_{1(oco)}$ Positive Sequence Potential Difference in OCO *(Volt)*
- $Vaa'_{1(tco)}$ Positive Sequence Potential Difference in TCO *(Volt)*

- **$Vaa'_{2(oco)}$** Negative Sequence Potential Difference in OCO *(Volt)*
- **$Vaa'_{2(tco)}$** Negative Sequence Potential Difference in TCO *(Volt)*
- **$Vbb'_{(tco)}$** Potential Difference between B Phase in TCO *(Volt)*
- **$Vbb'_{(thco)}$** Potential Difference between B Phase in THCO *(Volt)*
- **$Vcc'_{(tco)}$** Potential Difference between C Phase in TCO *(Volt)*
- **$Vcc'_{(thco)}$** Potential Difference between C Phase in THCO *(Volt)*
- **$Z_{0(oco)}$** Zero Sequence Impedance in OCO *(Ohm)*
- **$Z_{0(tco)}$** Zero Sequence Impedance in TCO *(Ohm)*
- **$Z_{1(oco)}$** Positive Sequence Impedance in OCO *(Ohm)*
- **$Z_{1(tco)}$** Positive Sequence Impedance in TCO *(Ohm)*
- **$Z_{2(oco)}$** Negative Sequence Impedance in OCO *(Ohm)*
- **$Z_{2(tco)}$** Negative Sequence Impedance in TCO *(Ohm)*

Constants, Functions, Measurements used

- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion
- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion
- Measurement: **Electric Potential** in Volt (V)
  Electric Potential Unit Conversion

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