XTR105 Resistance Calculation

(*) 0°C to 150°C ⇒ 4mA to 20mA

Find :-

$R_Z = ?$, $R_1 = ?$, $R_2 = ?$, $R_{Lin1} = ?$, $R_{Lin2} = ?$

Known Value :-

$R_{Lin} = 1K\Omega$, $T_{min} = 0°C$, $T_{max} = 150°C$

R_Z :- RTD Resistance at minimum measured temperature

$T_{min} = 100°C \Rightarrow$ $\boxed{R_Z = 100\Omega}$

R_1 :- RTD Resistance at midpoint measured Temperature.

$$\frac{T_{min} + T_{max}}{2} = \frac{0 + 150}{2} = 75°C \Rightarrow \frac{127.08 + 130.9}{2} = 128.99$$

(for 70°) (for 80°C)

$\boxed{R_1 = 128.99\Omega}$

R_2 :- RTD Resistance at the maximum measured temperature.

$\boxed{R_2 = 157.33\Omega}$

R_G :- Gain Calculation

$$R_G = \frac{2[R_2 - R_Z][R_1 - R_Z]}{[R_2 - R_1]} = \boxed{117.2989\Omega}$$

R_{Lin1} : Linearization resistance 1

$$R_{Lin1} = \frac{R_{Lin}[R_2 - R_1]}{2[2R_1 - R_2 - R_Z]} = \boxed{21.8K\Omega}$$

R_{Lin2} : Linearization resistance 2

$$R_{Lin2} = \frac{[R_{Lin} + R_G][R_2 - R_1]}{2[2R_1 - R_2 - R_Z]} = \boxed{24.356K\Omega}$$