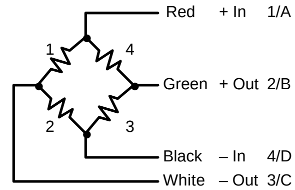

For + Rcal, shunt 1 or 3
For – Rcal, shunt 2 or 4

Wheatstone Bridge Strain Gage Equations

1.1 $$e_o = \frac{E_x}{4}\left(\frac{(GF)(\varepsilon)}{1 + \frac{(GF)(\varepsilon)}{2}}\right)$$ Voltage output from strain, 1 active arm

1.2 $$e_o = \left(\frac{N}{4}\right)(GF)(\varepsilon)(E_x)$$ Voltage output from strain, 2 or 4 active arms

1.3 $$e_o = \left(\frac{R_g}{R_c + \frac{R_g}{2}}\right)\left(\frac{E_x}{4}\right)$$ Voltage output from shunt calibration

1.4 $$e_o = \left(\frac{mV}{V}\right)\left(\frac{F}{F_{fs}}\right)(E_x)$$ Voltage output from load cell

2.1 $$R_c = \left(\frac{N_s}{4}\right)\left(\frac{R_g}{e_o}\right)(E_x) - \frac{R_g}{2}$$ Rcal to get a particular voltage output

2.2 $$R_c = \frac{(R_g)}{(N)(GF)(\varepsilon)} - R_g$$ Rcal to simulate a particular strain

3.1 $$E_x = \frac{4\,e_o}{(N)(GF)(\varepsilon)}$$ Excitation to get a voltage output from strain

3.2 $$E_x = \frac{(e_o)(F_{fs})}{\left(\frac{mV}{V}\right)(F)}$$ Excitation for load cells

4.1 $$\varepsilon = \frac{R_g}{(R_g + R_c)(GF)(N)}$$ Strain simulated by a shunt calibration resistor

4.2 $$\varepsilon = \left(\frac{4}{GF}\right)\frac{\left(\frac{e_o}{E_x}\right)}{\left(1 + 2\left(\frac{e_o}{E_x}\right)\right)}$$ Strain from test measurements using 1 active arm

4.3 $$\varepsilon = \frac{4(e_o)}{(N)(GF)\,E_x}$$ Strain from test measurements using 2 or 4 active arms

4.4 $$F = \frac{(e_o)(F_{fs})}{\left(\frac{mV}{V}\right)(E_x)}$$ Force readouts from test measurements

ε	=	Strain in in./in.	e_o	=	Output voltage in volts
E_x	=	Excitation voltage in volts	F	=	Force measured
F_{fs}	=	Force full scale	R_c	=	Shunt calibration resistance in ohms

R_g = Gage resistance (of the shunted gage when used with R_c) in ohms

N = Number of effective arms (consider gage configuration and Poisson's Ratio)

$\frac{m\,V}{V}$ = Millivolts per volt for full scale force

