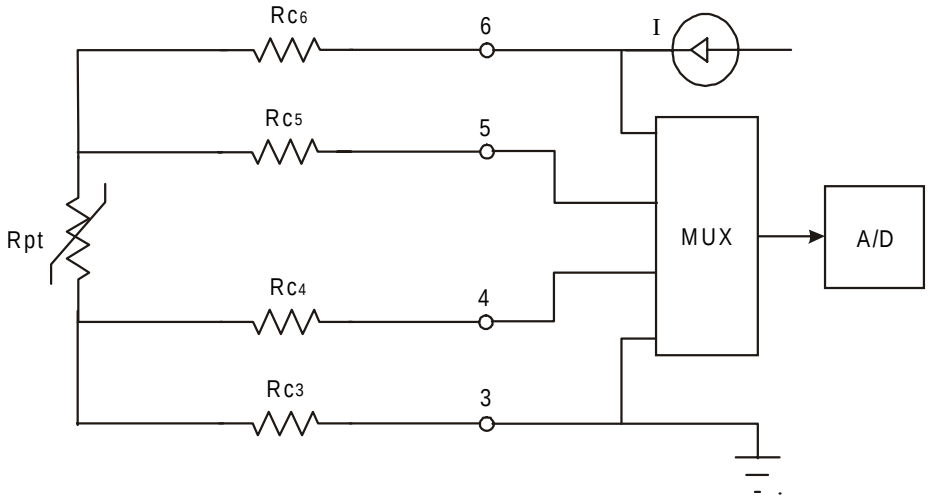
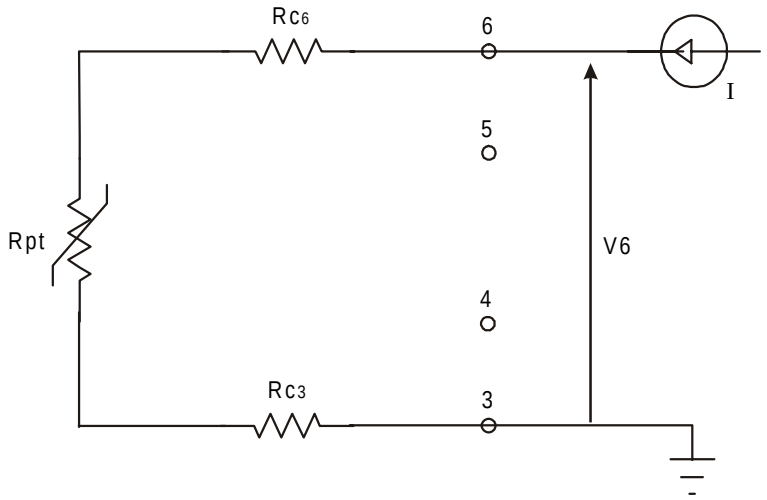
CABLE COMPENSATION TECHNIQUES

General set-up:



- The resistive sensor is connected by 2 to 4 wires to the transmitter input
- Each wire in the cable has a resistance of Rc
- A current is driven from the current generator I through Rc6, Rpt and Rc3 to ground
- The voltage potential at terminals 3 – 6 is measured sequentially by the A/D converter through the multiplexer. Calculations are done by a microprocessor

2- wire connection:

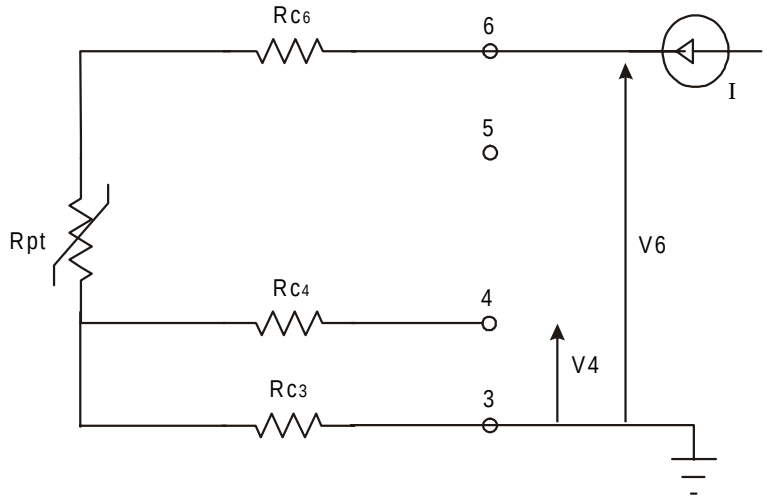


- Measure V6 and I
- V6 is the voltage drop across Rc6 + Rpt + Rc3
- Calculate Rpt:

$$R_{pt} + R_{c6} + R_{c3} = \frac{V_6}{I}$$

Note: Value too large by the sum of Rc6 + Rc3 !

3-wire connection:

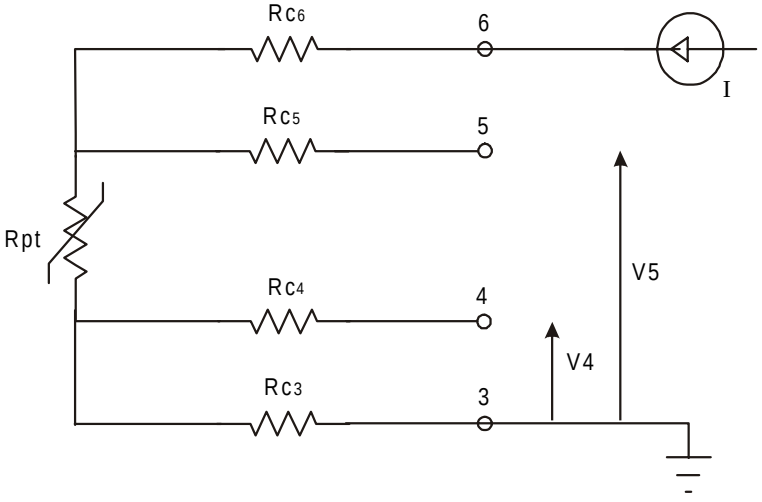


- Measure V4, V6 and I.
- V6 is the voltage drop across Rc6 + Rpt + Rc3
- V4 is the voltage drop across Rc3 (no current flow in terminal 4)
- Calculate Rpt:

$$R_{pt} = \frac{V_6 - 2 \cdot V_4}{I}$$

Note: Only true if Rc6 = Rc3 !

4–wire connection:



- Measure V4, V5 and I.
- No current flow in terminals 4 and 5, hence no voltage drop across Rc3 and Rc4
- Calculate Rpt:

$$R_{pt} = \frac{V_5 - V_4}{I}$$

Note: The most accurate method!