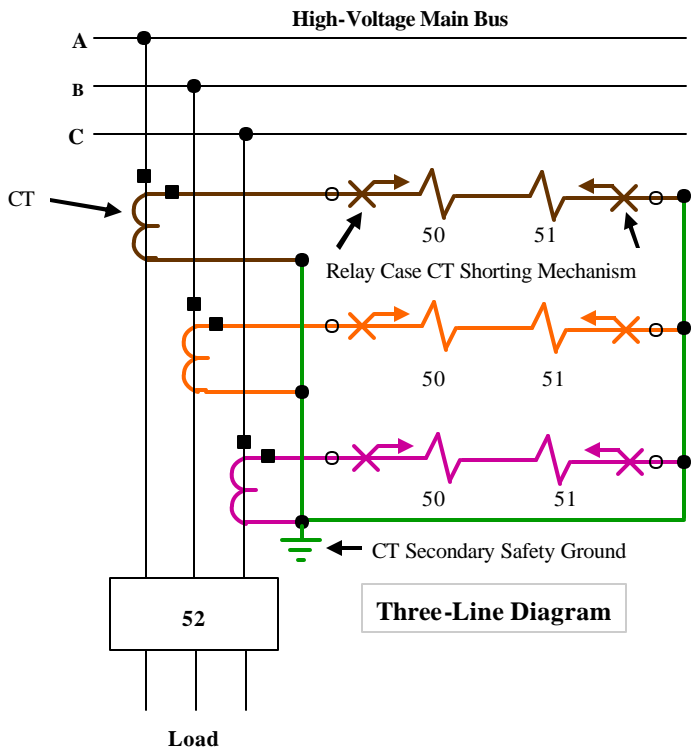


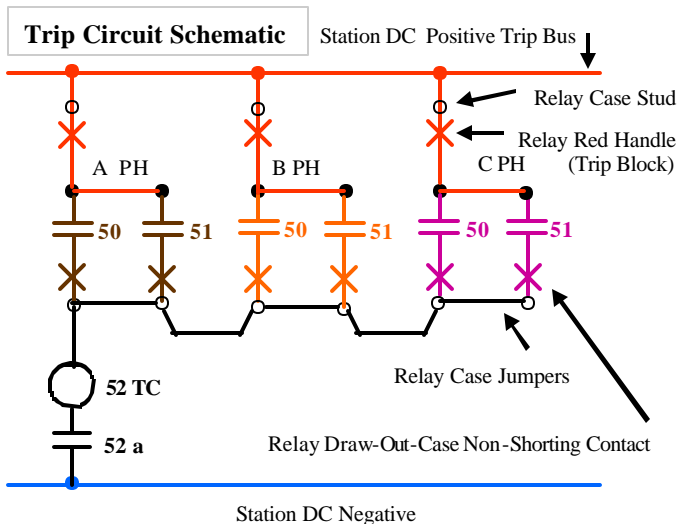
Print Reading Using ANSI Standard Device Numbers

- **Standard Device Designation Numbers** are used extensively on Medium and High-Voltage prints to identify various control functions. These numbers may also be used on 480 volt equipment prints.
- The system uses numbers 1 through 99. Some numbers are left blank for assignment to special functions which may be used within a particular company. See *The Electricians Notebook*, Archive Catalog for a complete listing.
- This numbering system will be employed on: One-Line Diagrams, Three-Line Diagrams, and Control Schematics (which are also known as Control Wiring Diagrams or CWD's). Familiarity with this standardized numbering greatly simplifies the interpretation of these electrical drawings.

Shown below is a typical Three-Line Diagram and the associated Trip-Circuit Schematic which illustrate the use of these numbers. These drawings use the following Standard Device Designations Numbers: **50** - Instantaneous Overcurrent Relay, **51** - Time Overcurrent Relay, **52** - AC Circuit Breaker. All devices associated with the Circuit Breaker have a 52 prefix: **52 TC** is the circuit breaker Trip Coil, **52a** is an auxiliary contact in the breaker (Note: "a" contacts follow the breaker main contacts, "b" contacts are opposite the breaker position). The Protective Relays (50/51 Devices) shown are typical of single-phase electro-mechanical units.



Three-Line Diagram



Trip Circuit Schematic

Circuit Operation

- Current flow from polarity ■ to non-polarity in the Current Transformer (CT) primary forces current out the CT secondary polarity ■ lead, through the protective relay elements, and back to the CT non-polarity lead.
- The non-polarity side of the CT secondary windings are wye (bridged) toward the protected zone.
- The relays "look" through the breaker, so when the breaker clears the fault, the relays will reset.

Circuit Operation

- When the breaker is closed, the **52a** contact will be closed.
- If a phase instantaneous or time overcurrent condition occurs, the current in the relay elements (coils) in the above diagram will exceed the relay *set-point value*, causing the appropriate relay contact to close and send DC trip current to the Circuit Breaker **52 TC** Trip Coil. (Note: 24 VDC, 48 VDC, and 130 VDC are commonly used for control power.)
- When the breaker trips, the **52a** auxiliary contact will open and remove tripping power from the trip coil. (This is a short-time-duty coil). Sometimes several "a" contacts are connected in series to insure that the DC control power arc is extinguished. (DC is more difficult to break because it does not go through zero each half-cycle as with AC.)