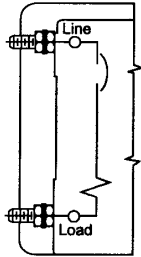


Internal Circuits for Protective and Control Applications

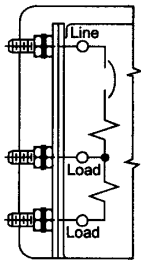
Circuit breakers are often overlooked as control elements in industrial circuit design. The seven constructions outlined below illustrate the broad range of possibilities currently available on standard products. When used singly or in combination, these special circuits allow breakers to become more meaningful members of modern control systems. Other designs are also available for more unusual applications. Consult HEINEMANN for assistance.



Series-Trip

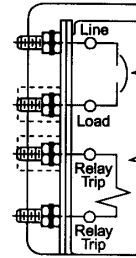
In this conventional circuit breaker configuration, the sensing coil and contacts are wired in series with the line and load terminals.

This standard design is used in breakers that see duty as main switches and as short circuit protectors in supply-voltage wiring. They also provide overload protection for a wide variety of equipment and components such as transformers, solenoids and motors.



Dual Rating

This construction employs two concentrically wound sensing coils to provide two discrete current ratings in the same breaker. This permits the use of a single breaker to protect equipment designed to operate at two different current levels, or two different supply voltages, such as 6/12V DC or 110/220V 50/60 Hz. Certain limitations may govern application; consult HEINEMANN for assistance.



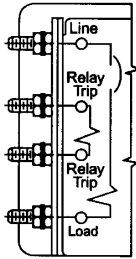
Relay-Trip

The relay-trip design provides a tripping coil that is actuated from a remote device (any control switch or even another circuit breaker). Because the relay-trip coil is isolated from the contact circuit, either control current or voltage may be employed to trip the breaker.

Relay-trip breakers are available with voltage-sensing or current-sensing coils, with or without intentional trip delay. (Non-delay is standard and will be provided unless otherwise specified.)

Voltage-sensing coils are usually designed for non-continuous duty, and provision must be made for de-energizing when the contacts are opened. Continuous-duty voltage coils, within certain limitations, can also be supplied. Consult HEINEMANN for parameters.

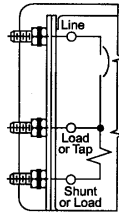
It is important to note that the current or voltage ratings of both coil and contact circuits should be specified separately.



Dual Controlled (DuCon™)

In applications where over-current conditions and a separate (unrelated) voltage signal must be sensed, the general practice has been to use a two-pole breaker — one pole a series-trip and the other a relay- or shunt-trip.

For applications where space does not permit the use of a two-pole unit, the DuCon adds a small non-continuous duty voltage-sensing coil to a one-pole series-trip breaker, using either relay-trip circuitry for energizing from a source other than line voltage, or shunt/tap circuitry for operation on the same power source as that used in the overload protection circuit.



Shunt/Tap

The shunt/tap design allows remote tripping through appropriate circuit-closing contacts in a remote device. (On breakers rated 1A and below, the design can also be used to raise the breaker's trip point by shunting with an external resistor between the load and shunt terminals.) Unlike relay-trip models, shunt/tap breakers operate on the line voltage, rather than from a secondary power source.

It is important that the combined current through the load and the shunt/tap terminals not exceed the contact rating.

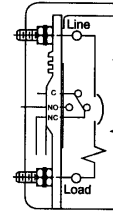
Although non-delay construction is standard with shunt/tap breakers, trip-delay response can also be provided.

Voltage coils are designed for non-continuous duty and must be de-energized when the contacts are open. (Within specific limitations, continuous-duty voltage coils are also available.)

High-Inrush

This is the ideal breaker configuration for protecting circuits likely to encounter high-inrush loads up to 30 times (3000%) rated current for one-half cycle at 60 Hz. Surges in this category are commonly found with startup of such devices as data processing distribution transformers and ferroresonant power supplies.

The high-inrush design eliminates nuisance tripping without the need for breaker derating, thereby providing closer tolerance circuit protection.



Auxiliary Switch

A miniature snap-action switch, mounted on the back of the breaker, is mechanically connected to the breaker's switching mechanism. Switching in conjunction with the breaker itself, the secondary switch can be used to activate logic functions, alarms, lights and other circuits.

The auxiliary switch is in the normal position (NO or NC) when the breaker is in the OFF position. Contact capacity is 10A at 125/250V (50/60 Hz), 4A resistive at 30V DC, and 2.5A inductive at 30V DC. Minimum operating voltage is 6V DC or V AC, and power 3V AC or DC. (Lesser voltages can also be accommodated. Contact HEINEMANN.)

A separate auxiliary alarm switch, actuated only by electrical tripping of the breaker, is also available.

