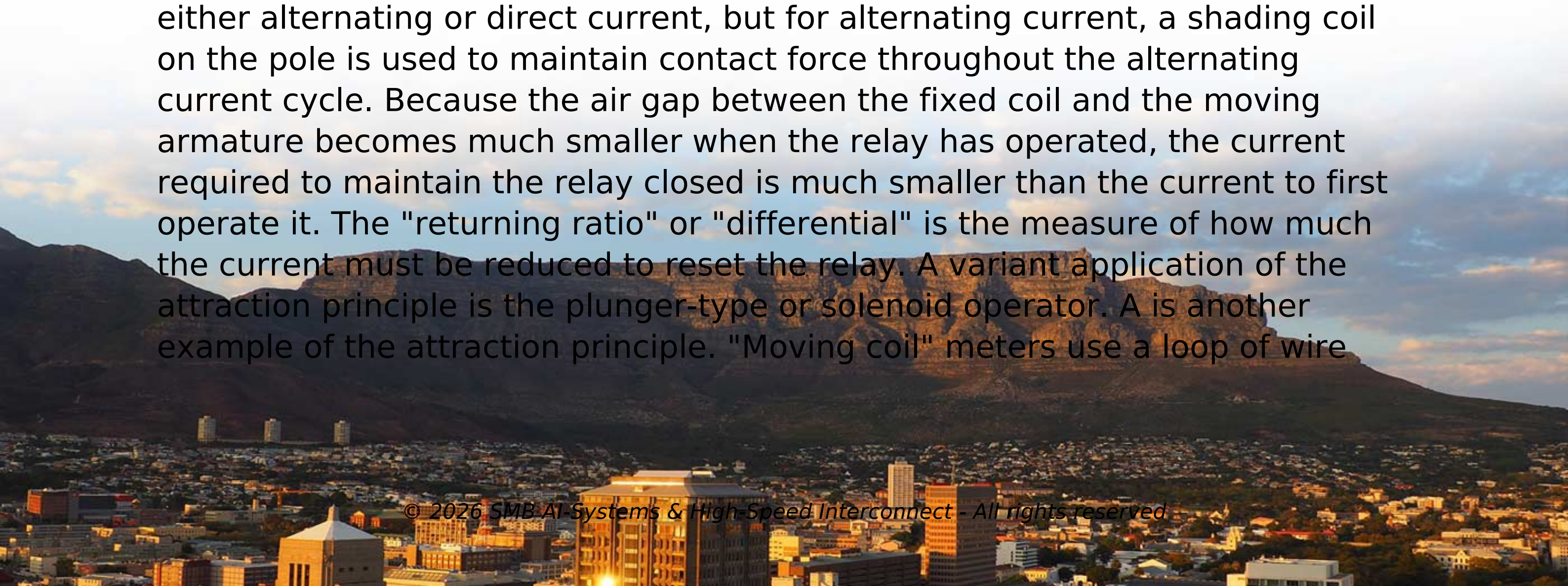
How many power circuits are needed for a relay protection device

Overview

Electromechanical relays can be classified into several different types as follows: "Armature"-type relays have a pivoted lever supported on a hinge or knife-edge pivot, which carries a moving contact. These relays may work on either alternating or direct current, but for alternating current, a shading coil on the pole is used to maintain contact force throughout the alternating curre. Electromechanical relays can be classified into several different types as follows: "Armature"-type relays have a pivoted lever supported on a hinge or knife-edge pivot, which carries a moving contact. These relays may work on either alternating or direct current, but for alternating current, a shading coil on the pole is used to maintain contact force throughout the alternating current cycle. Because the air gap between the fixed coil and the moving armature becomes much smaller when the relay has operated, the current required to maintain the relay closed is much smaller than the current to first operate it. The "returning ratio" or "differential" is the measure of how much the current must be reduced to reset the relay. A variant application of the attraction principle is the plunger-type or solenoid operator. A is another example of the attraction principle. "Moving coil" meters use a loop of wire



turns in a stationary m. In, a protective relay is a device designed to trip a when a is detected. The first protective relays were electromagnetic devices, relying on coils operating on moving parts to provide detection of abnormal operating conditions such as over-current,, reverse flow, over-frequency, and under-frequency. Microprocessor-based digital protection relays now emulate the original devices, as well as providing types of protection and supervision impractical with electromechanical relays. provide only rudimentary indication of the location and origin of a fault. In many cases a single microprocessor relay provides functions that would take two or more electromechanical devices. By combining several functions in one case, numerical relays also save capital cost and maintenance cost over electromechanical relays. However, due to their very long life span, tens of thousands of these "silent sentinels" are still protecting transmission lines and electrical apparatus all over the world. Important transmission lines and generators have cubicles dedicated to protection, with many individual electromechanical devices, or one or two microprocessor relays. The theory and application of these protective devices is an important part of the education of a who specializes in. The need to act quickly to protect circuits and equipment often requires protective relays to respond and trip a breaker within a few thousandths of a second. In some instances these clearance times are prescribed in legislation or operating rules. A maintenance or testing program is used to determine the performance and availability of protection systems. Based on the end application and applicable legislation, various standards such as ANSI C37.90, IEC255-4, IEC60255-3, and IAC govern the response time of the relay to the fault conditions that may occur. Electromechanical protective relays operate by either, or. Unlike switching type electromechanical with fixed and usually ill-defined operating voltage thresholds and operating times, protective relays have well-established, selectable, and adjustable time and current (or other operating parameter) operating characteristics. Protection relays may use arrays of, shaded-pole, magnets, operating and restraint coils, solenoid-type operators, telephone-relay contacts, and phase-shifting networks. Protective relays can also be classified by the type of measurement they make. A protective relay may respond to the magnitude of a quantity such as voltage or current. Induction relays can respond to the product of two quantities in two field coils, which could for example represent the power in a circuit. "It is not practical to make a relay that develops a torque equal to the quotient of two a.c. quantities. This, however is not important; the only significant condition for a relay is its setting and the setting can be made to correspond to a ratio regardless of the component values over a wide range." Several operating coils can be used to provide "bias" to the relay, allowing the sensitivity of response in one circuit to be controlled by another. Various combinations of "operate torque" and "restraint torque" can be produced in the relay. By use of a permanent magnet in the, a relay can be made to respond to current in one direction differently from in another. Such are used on direct-current circuits to detect, for example, reverse current into a generator. These relays can be made bistable, maintaining a contact closed with no coil current and requiring reverse current to reset. For AC circuits, the principle is extended with a polarizing winding connected to a reference voltage source. Lightweight contacts make for sensitive relays that operate quickly, but small contacts can't carry or break heavy currents. Often the measuring relay will trigger auxiliary telephone-type armature relays. In a large installation of electromechanical relays, it would be difficult to determine which device originated the signal that tripped the circuit. This information is useful to operating personnel to determine the likely cause of the fault and to prevent its re-occurrence. Relays may be fitted with a "target" or "flag" unit, which is released when the relay operates, to display a distinctive colored signal when the relay has tripped. The various protective functions available on a given relay are denoted by standard. For example, a relay including function 51 would be a timed overcurrent protective relay. An overcurrent relay is a type of protective relay which operates when the load current exceeds a pickup value. It is of two types: instantaneous over current (IOC) relay and definite time overcurrent (DTOC) relay. The is 50 for an IOC relay or a DTOC relay. In a typical application, the over current relay is connected to a current transformer and calibrated to operate at or above a specific current level. When the relay operates, one or more contacts will operate and energize to trip a circuit breaker. The DTOC relay has been used extensively in the United Kingdom but its inherent issue of operating slower for faults closer to the source led to the development of the IDMT relay. A definite time over-current (DTOC) relay is a relay that operates after a definite period of time once the current exceeds the pickup value. Hence, this relay has current setting range as well as time setting range. An instantaneous over-current relay is an overcurrent relay which has no intentional time delay for operation. The contacts of the relay are closed instantly when the current inside the relay rises beyond the operational value. The time interval between the instant pick-up value and the closing contacts of the relay is very low. It has low operating time and starts operating instantly when the value of current is more than the relay setting. This relay operates only when the impedance between the source and the relay is less than that provided in the section. An inverse-time over-current (ITOC) relay is an overcurrent relay which operates only when the magnitude of their operating current is inversely proportional to the magnitude of the energize quantities. The operating time of relay decreases with the increases in the current. The operation of the relay depends on the magnitude of the current. An inverse definite minimum time (IDMT) relay is a protective relay which is developed to overcome the shortcomings of the definite time overcurrent (DTOC) relays. If the source impedance remains constant and the fault current changes appreciably as we move away from the relay then it is advantageous to use IDMT overcurrent protection to achieve high speed protection over a large section of the protected circuit. However, if the source impedance is significantly larger than the feeder impedance then the characteristic of the IDMT relay cannot be exploited and DTOC may be utilized. Secondly if the source impedance varies and becomes weaker with less generation during light loads then this leads to slower clearance time hence negating the purpose of the IDMT relay. standard 60255-151 specifies the IDMT relay curves as shown below. The four curves in Table 1 are derived from the now withdrawn BS. Relays can also be classified by their type of power source. • Self-powered relays operate on energy derived from the protected circuit, such as through the current transformers used to measure line current. Self-powered relays are advantageous in terms of cost and reliability as they do not require a separate power supply.• Auxiliary-powered relays rely on a battery or external AC supply. Some relays can use either AC or DC. The auxiliary supply must be highly reliable during a system fault to ensure the relay can operate.• Dual-powered relays are powered by the protected circuit and through an auxiliary power source which acts as a backup.

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	Relays detect overloads, short circuits, and earth faults on feeders, ensuring that faults are cleared locally without affecting the rest of the system''s performance or service continuity.
	This handbook covers the code of practice in protection circuitry including standard lead and device numbers, mode of connections at terminal strips, colour codes in multicore cables, dos …
	Protective relays are used in industrial power generation and supply systems to open and isolate branch circuits in the case of excessive current. They are activated by …
	Almost every electrical or control panel created for residential, commercial, or industrial use includes at least one incoming power circuit, some amount of internal power distribution, and power or …

	For the case of unidirectional overcurrent protection, only current transformers are required, whereas for directional overcurrent protection, or impedance protection, additional voltage transformers are …
	In overcurrent, the four most used common types of protection relays are 50, 50N, 51, and 51N. In this post, we will understand these types of protection relays.
	Let''s have a discussion on basic concept of protection system in power system and coordination of protection relays. In the picture the basic connection of protection relay has been shown.
	There are many types of protective relay functions, but this presentation will focus on the most common type, basic overcurrent device 50/51 (instantaneous and time overcurrent).
	Abstract: Protective relays and devices have been developed over 100 years ago to provide “last line” of defense for the electrical systems. They are intended to quickly identify a fault and isolate it so the …
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