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**ENEE5102**

# "Protection Relays Discussion"

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In this experiment , we investigated a several types of Protection relays and got hands on the pricnciple of its operation.

Single-phase voltage and current monitoring relays protect sensitive equipment and control systems against undervoltage (brownout) or undercurrent events or overvoltage or overcurrent events. Different units with adjustable or fixed threshold values (trip points) are available. The following titles are for some ideas we got hands on.

**Current monitoring**
The current monitoring relays reliably monitor currents, which exceed or fall below the selected threshold value. The functions overcurrent or undercurrent monitoring can be preselected.
**Current window monitoring (Imin, Imax)**
The window monitoring relay is the right solution if the application requires the simultaneous monitoring of over and undercurrents.
**Voltage monitoring**
The voltage monitoring relays are used to monitor direct and alternating voltages. Over- or undervoltage detection can be preselected.
**Voltage window monitoring (Umin, Umax)**
For the simultaneous detection of over- and undervoltages, the window monitoring relay can be used

**Monitoring for over- and undervoltage**
All electric devices can be damaged when operated continuously at voltages over or under their rated values. An overvoltage could potentially cause heating within the device. If the temperature is unduly high, component parts and thus whole devices or installations may fail or may be destroyed. Undervoltages involve the risk that the switching elements reach an undefined state. In this case, parts of the installation still function, but not others. This misoperation can result in damage of the product or installation. In the worst case, wrong voltages may even cause harm to the operating personnel.

**Phase unbalance monitoring**
If the supply by the three-phase system is unbalanced due to uneven distribution of the load, the motor will convert a part of
the energy into reactive power. This energy gets lost unexploited; also the motor is exposed to higher thermal strain. Other
thermal protection devices fail to detect continuing unbalances which can lead to damage or destruction of the motor.

**Phase sequence monitoring**

A change of the phase sequence during operation or an incorrect phase sequence that is applied at start-up will cause a three-phase motor to run with reverse rotation. Certain motors when operated in the reverse direction will cause severe damage to connected loads such as pumps, screw compressors and fans. Especially for non-fixed or portable equipment, such as construction machinery, phase sequence detection prior to the start-up process is highly recommended.