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Project: Voltage Reduction System - Second Generation

● **Description:**

- This device achieves energy savings by reducing the voltage delivered to metal halide and other kinds of street lamps.
- If these lamps are sufficiently warmed up, the light of the lamps is reduced only 10 percent if the voltage applied to them is reduced by up to 50%.
- This can be achieved through a VRS device. VRS allows the lamps to be warmed up and then can operate manually or use an Ethernet updatable schedule to change the applied voltage to the lamps.
- The first generation of VRS was consisted of a “Control Card” and a “Relay Card”.
- The “Relay Card” on the first generation of VRS allowed for a maximum of 20 Amperes of output current.
- The objective of the second generation design is to make a “Contactor Interface Card” that is pin compatible with the “Relay Card” so it can be used with the same “Control Card” and can deliver at least 40 Amperes of output current.
- The design of the “Contactor Interface Card” surpassed the design requirements. It is able to drive a large variety of contactors.
- The Design is isolated from the output current so it can deliver as much current as a contactor compatible with the card can carry to the output.
- All the contactors are checked for “Close Fault” and “Open Fault” for safety and the system will operate at bypass voltage if a fault is detected.

● **Technical Features:**

- Compatible with any contactor with 24VAC “coil voltage” where the coil draws less than 8 Amperes from the 24VAC control signal. This covers a wide variety of contactors.
- Output voltage and current are independent of the board and can be as high as the contactors allow. There is, however, a 5000VRMS limit for voltage to comply with the voltage isolation limits of the board in case of accident.
- Used Snubberless™ triacs along with a snubber circuit for added reliability to control the contactors.
- Over 5000VRMS isolation between the “Control Card” signals (3.3VDC and 12VDC) and the contactor control voltage (24VAC) for added safety and reliability.
- Used extra sensitive opto-couplers operating with less than 1mA forward current to check for contactor “Open Fault” and “Close Fault”.
- All of the electronic parts on the board have “UL94-V0 Flammability Standard” for safety in case of accident.
- Firmware updated to handle the lower speed of the contactors compared with the relays used in the First Generation of VRS.