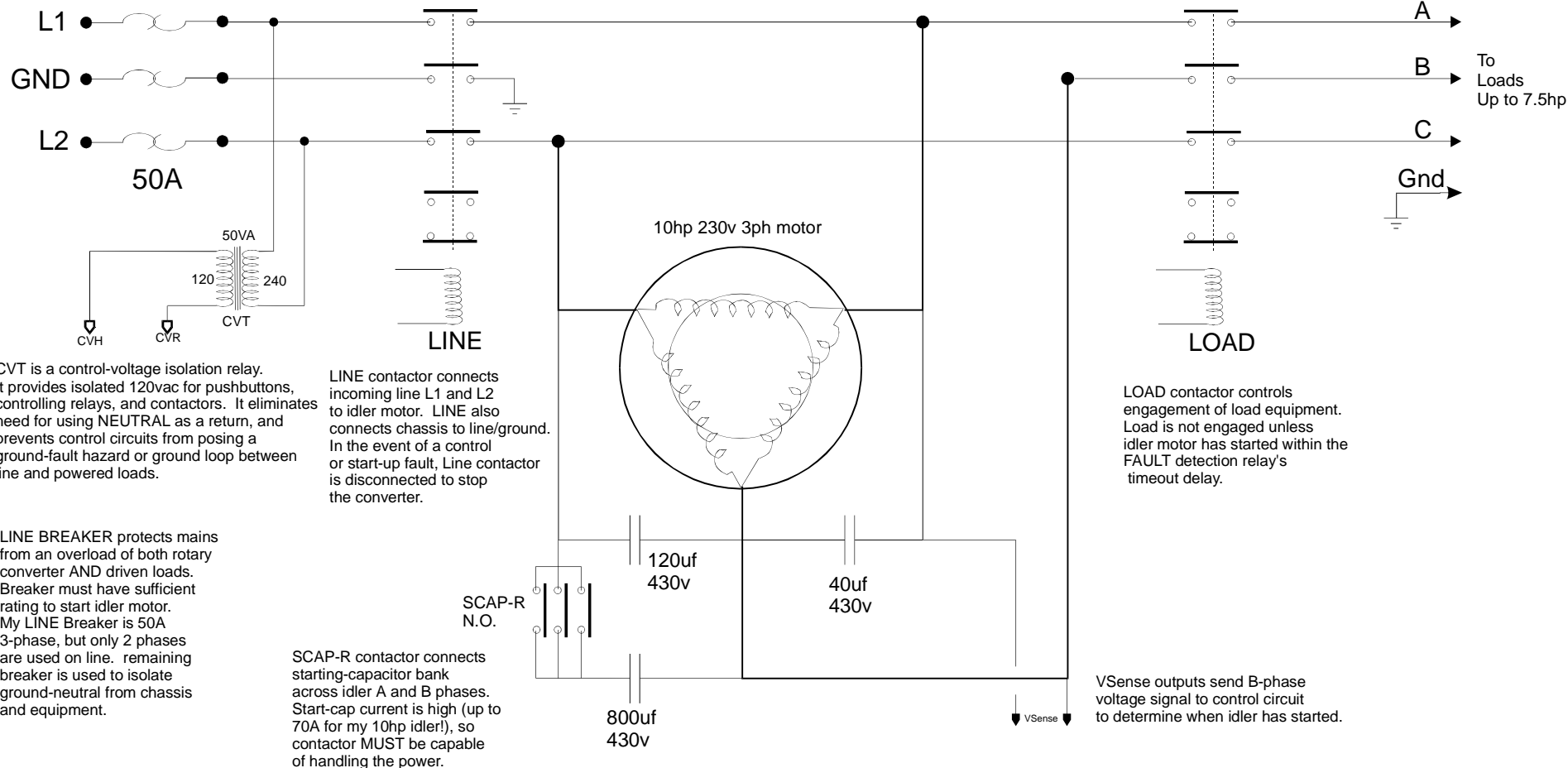


240vac  
single-phase  
mains in



Idler motor can be ANY 3-phase motor suitable for 230-250v operation. Idler motor serves as a 'rotary inductor', or rotating transformer. When coupled with run capacitors, the undriven phase ("B") becomes a 'secondary' winding, providing a 'manufactured' 3rd phase to power 3-phase equipment.

Note that the rotary-converter motor must be approximately 25% larger than the load you intend to drive. Mine has a 10hp motor, and the finished converter is suitable for a 7.5hp load.

Motor Start capacitors provide additional phase-shift and phase current to **START** the idler motor in the proper direction.

Capacitors must be sized to fit **YOUR** motor. Use approximately 80 Microfarads per motor HP.

Excessive, or insufficient capacitance will prevent motor from starting.

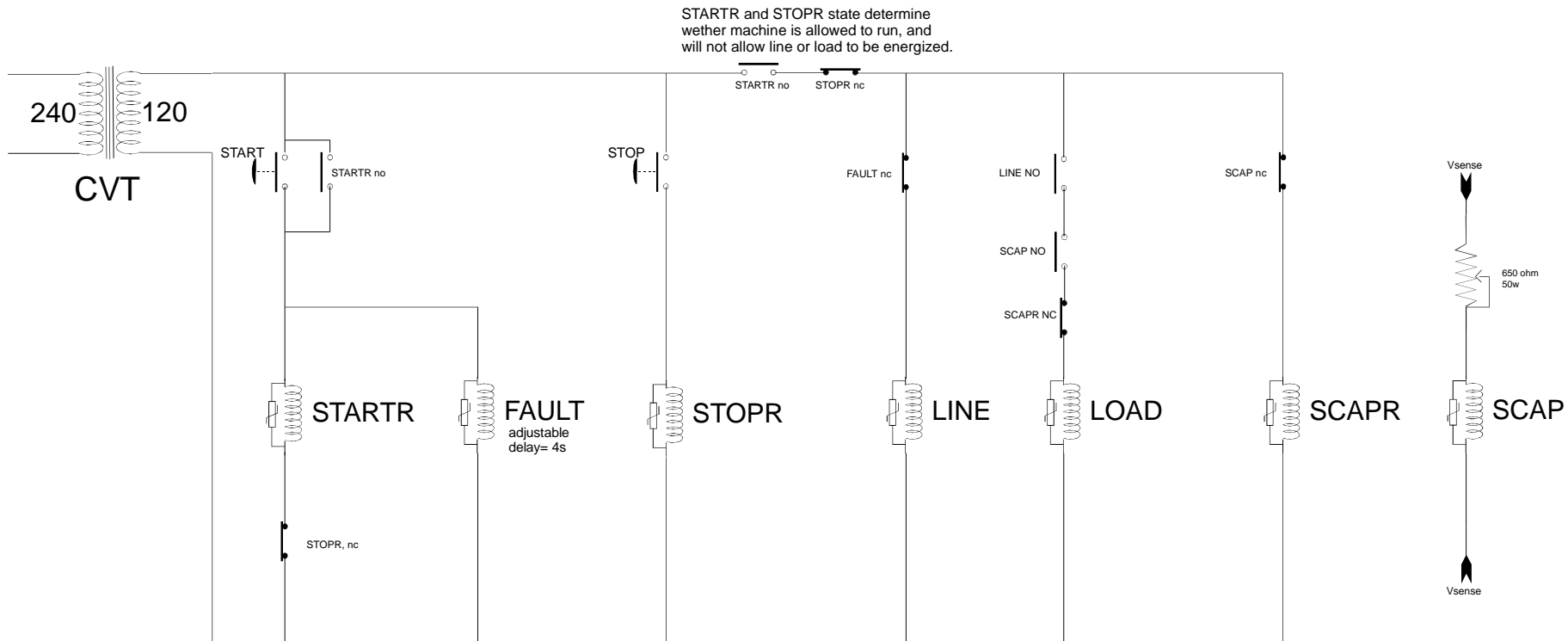
Motor Run capacitors provide necessary phase shift to run a 3-phase (120-degree) idler motor motor on single-phase (180-degree) power.

Motor Run capacitors **MUST** be properly sized for **YOUR** motor. General starting point: Use 15 microfarads per HP for A-B, and 5microfarads per hp for B-C, where B is 'manufactured phase'.

Once motor run has been established, measure A-B and B-C voltage, and adjust capacitance to make voltages closest to match. Getting under 10% is good.

## Rotary Phase Converter with Self-Starting Relay Control and Fault Protection

Dave Kamp 12/2004



START pushbutton energizes STARTR. STARTR NO contact closes, holding STARTR in 'latched on' state.

STOP relay NC contact opens to release the 'latched-on' state.

FAULT detection relay is an adjustable timer. When energized, relay contacts close 4 seconds later.

STOP pushbutton energizes STOPR, which opens NC contact to break STARTR latch circuit.

LINE relay is only energized when machine is in ON state and no FAULT is detected

LOAD contactor does not allow LOAD to be connected unless idler has successfully started (SCAP) and starting contactors (SCAP-R) have been disengaged, and after FAULT detection time has been passed.

SCAP-R is energized on initial startup, connecting start capacitors. Once SCAP detects a running idler motor, SCAP-R drops out.

SCAP detects presence of manufactured-phase voltage across phases B-C. When sufficient voltage and current appears, SCAP closes to disengage SCAP-R.

Variable resistor is installed to limit current through the coil of SCAP. I used an ordinary contactor with 120v coil. Pull-in occurs at 75v, drop out is at 30v. B-C voltage of running idler is around 245v. 650 ohms limits coil current to prevent burnout, and making coil pull in at around 225v.

## Rotary Phase Converter with Self-Starting Relay Control and Fault Protection

Dave Kamp 12/2004