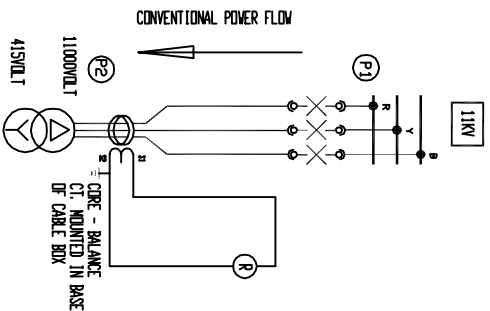


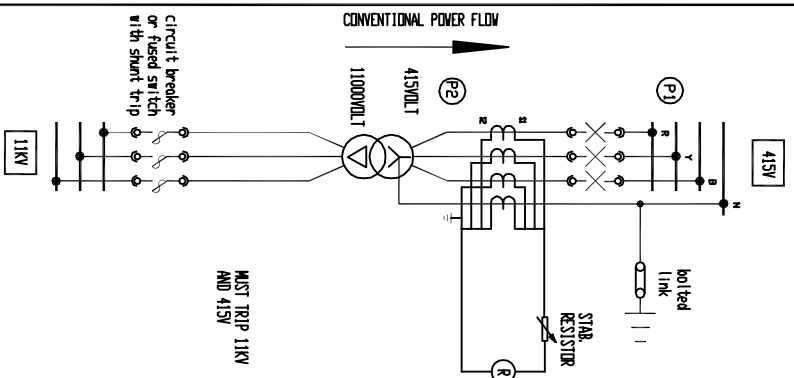
USING RESIDUALLY CONNECTED C.T.S.
MUST TRIP 11kV AND IF REVERSE POWER FLOW IS POSSIBLE, MUST TRIP LV AS WELL.

11kV REF PROTECTION (AUTOMATICALLY RESTRICTED)
DRAWING NO 1

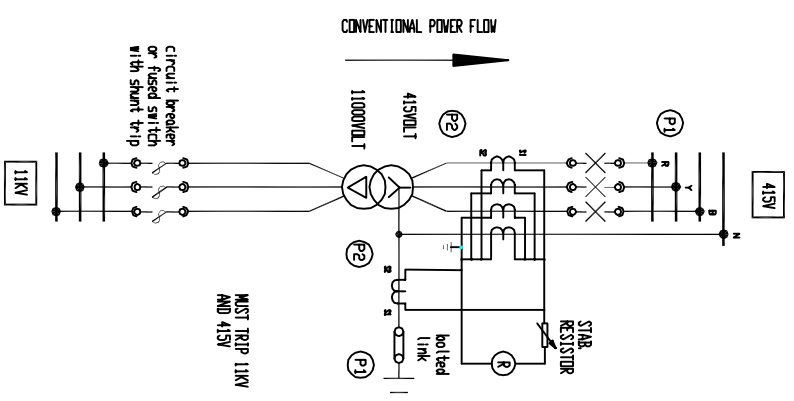


USING CORE BALANCE C.T.
MUST TRIP 11kV AND IF REVERSE POWER FLOW IS POSSIBLE, MUST TRIP LV AS WELL.

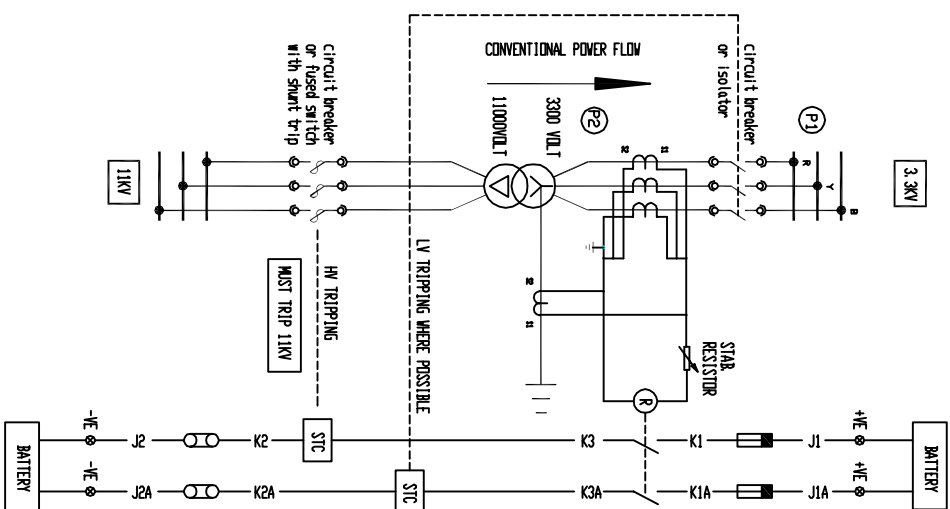
11kV REF PROTECTION (AUTOMATICALLY RESTRICTED)
DRAWING NO 2



415V REF PROTECTION WITH EARTHING AT THE SWITCHBOARD
DRAWING NO 3



415V REF PROTECTION WITH EARTHING AT THE POWER TRANSFORMER
DRAWING NO 4



3.3kV REF PROTECTION WITH TRANSFORMER EARTHING
DRAWING NO 5

NOTES RELATING TO REF PROTECTION

11kV MAIN C.T.S. CLASS X, RELAY NEAR C.T.S. MAY BE 5A
LOWER RATIO C.T.S. AND/OR RELAY SOME DISTANCE FROM C.T.S. SUGGEST 1A OR 0.5A
THROUGH FAULT LEVEL DESIGN USUALLY NO MORE THAN 20 X THE RATING
STABILIZING RESISTOR ESSENTIAL WHEN USING HIGH IMPEDANCE RELAYS (EG TYPE CAG 14 GEC)
STABILIZING RESISTOR NOT NECESSARY WHEN USING CORE BALANCE BUT CARE REQUIRED WHEN USING THIS SYSTEM
METROSTULS REQUIRED WHEN HIGH KNEE POINT VOLTAGES ARE EXPECTED (REFER TO C.T. MANUFACTURER FOR DETAILS)

FORMULA FOR CALCULATING STABILIZING RESISTOR AS FOLLOWS

$$R = \frac{V_k - V_A}{2 \cdot I_r}$$

IMPORTANT NOTE
MUST ONLY HAVE ONE EARTH CONNECTION
FOR EACH TRANSFORMER