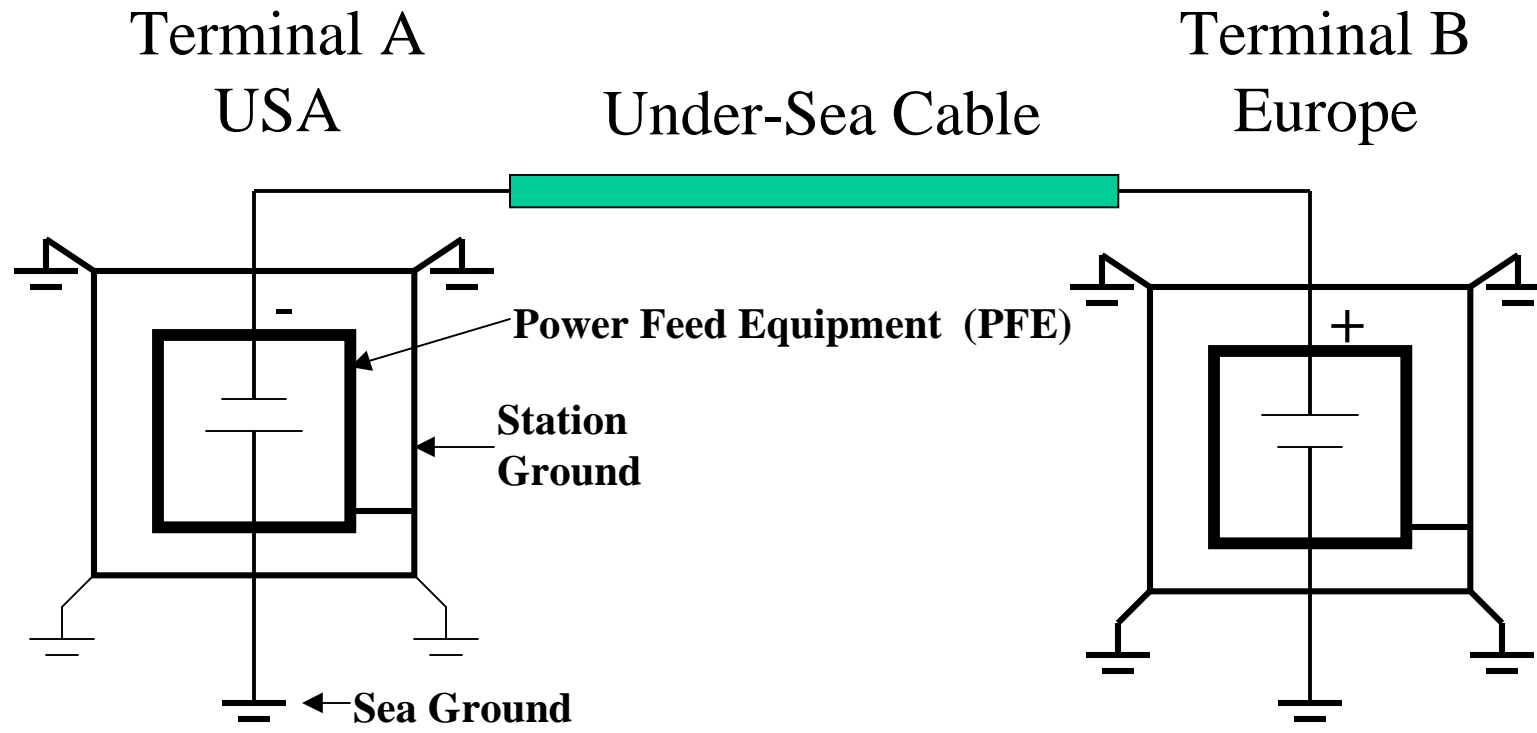


Electrical Protection for Under-Sea Cable Facilities

4/14/2000

Thomas G. Croda, Sprint

Power Feed System



Protection Issues

- Power Feed Equipment
- Terminal Facilities
- Cable

Power Feed Equipment Parameters

- System Voltage - 200 to 12,000 VDC
- System Current - 0.5 to 1.6 ADC
- Constant Current System
- Redundant

Typical PFE

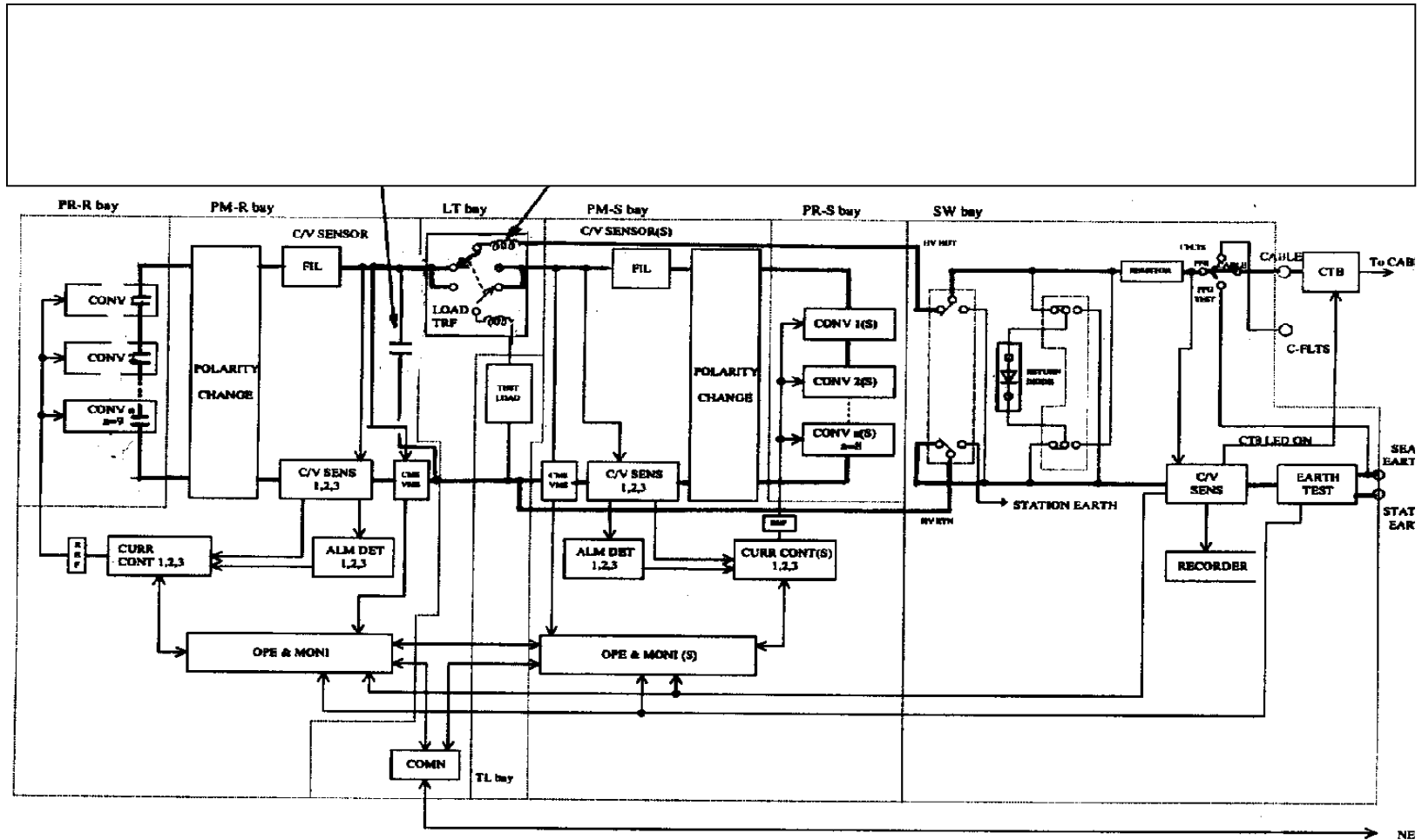


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Power Feed Equipment Protection

- Transient Over-voltage devices across the output
- Over-current control in system
- Steady State Over-voltage control in the system



CMS: CURRENT MONITORING SENSOR
 VMS: VOLTAGE MONITORING SENSOR

HV PFE Block Diagram

Terminal Facility Protection

- Minimize transient voltage between Station Ground and Sea Ground
- Sea Ground is located remote from the Station Ground
- At one site the Sea Ground is 12 Km from Station
- 25 to 50 VDC difference between Grounds allowed.

Protection Elements

- MOV device between Sea Ground and Station Ground
- Other possibilities
 - Gas Tube Element
 - Solid State Device
 - Air Gap