

Patton & Cooke Callenberg Series

High Voltage Shore Power Coupler System

When Princess Cruises required a solution to connect their four Sun Class vessels to High Voltage shore power while docked at the pier in Juneau, Alaska, Patton and Cooke helped "make the connection"



Engine Control Room



Alaska Electric Light & Power shore side power station, Juneau, Alaska

Patton and Cooke C150 Series Plugs and Receptacles mounted on an ABB power management System



Features

- ◆ Quick coupler system helps meet requirement for fast transition (less than ½ hour)
- ◆ Compatible with both 11kV and 6.6kV vessels at up to 13MW
- ◆ Ship system fully linked to shore system for added safety

Benefits

- ◆ Fast and safe Installation: coupling system is easily managed by single crew and shore personnel
- ◆ Provides access to clean, hydroelectrically generated shore power
- ◆ Compact, durable construction built to last in marine conditions

"There was no blue print to turn to because this hasn't been done before in the cruise industry"

*Dean Brown,
President
Princess Tours*

Meeting your high voltage electrical equipment needs



SUPERIOR

High Voltage Equipment Solutions. Design and Manufacturing



new shore connection HV room to accommodate the new HV circuit breaker cubicle



Princess Cruise Ship sails in pristine Alaskan waters



- ▶ Vessel spare HV cell (in the main switchboard) rated at 975 amps
- ▶ System able to handle voltages exceeding 11kV
- ▶ Couplers designed and certified for up to 15kV / 500 amperes with fault levels at 27KA (certified for up to 35kA)
- ▶ Maximum load for the vessels is 8mW (based on the ratings of the existing spare circuit breakers)
- ▶ System is designed for a maximum load of up to 13mW on both 6.6 and 11kV
- ▶ Vessel electrical network powered by 4 generators, each rated 11.2mW at 6.6kV supplying a total capacity of 44.8mW and controlled by a system consisting of four components (for each engine):
 - ▶ PCL controller - 537
 - ▶ Synchronizer - DSM
 - ▶ Real Power Sensor - RPS
 - ▶ Engine mounted actuator / governor
- ▶ Onboard electrical network:
 - ▶ 3-phase system with the neutral grounded through a Neutral Grounding Resistor (NGR)
 - ▶ Same system implemented shore side by Alaska Electric Light & Power Company (AEL&P) to maintain system integrity
 - ▶ Substation connected to 69kV network
 - ▶ Transformer has two sets of secondary windings:
 - ▶ One winding takes the voltage down to 12.47kV at 8.75mW (for an electric boiler which supplies steam to the vessels)
 - ▶ The second winding takes the voltage down to 11kV with another tap for 6.6kV
- ▶ The shore side transformer voltage drop from no-load to full-load estimated to be about 5%
- ▶ No-load voltage from the transformer in the area of 6900V for the 6.6kV vessels (to maintain voltage and frequency within tolerances)
- ▶ Voltage matching is necessary in order to minimize the reactive load-transient when synchronizing



We make the connection.



TECHNOLOGY

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Typical shell door cable entry system



Coupler connection being demonstrated by Princess Crew member



Vessel Power Management System with Patton and Cooke C150 Receptacles

Specifications:

- ▶ Ramp time: 40 kW/ sec. (approx.) and similar for reactive load (Normal load for these ships is 6500 to 7000 kW when in Juneau)
- ▶ Able to handle voltages exceeding 11kV
- ▶ 8MW maximum load for vessels (based on the ratings of the existing spare circuit breakers)
- ▶ System designed for a maximum load of up to 13mW on both 6.6 and 11kV
- ▶ Connection time is less than 1/2 hour, including all safety checks
- ▶ After the cables are plugged in, the process is fully automatic

"... This announcement clearly demonstrates that Princess does care about the local environment and air quality in Juneau, and that we're committed to innovative ways to prove this dedication..."

Dean Brown,
President
Princess Tours



Features

- ◆ Easy maintenance with front end removable contacts
- ◆ Fire retardant insulators
- ◆ Sturdy, corrosion resistant cast aluminum or epoxy coated bodies
- ◆ Secure three bolt, quick flip connection (for > 8kV)
- ◆ Solder type or optional solderless conductor stems (for < 8kV)
- ◆ Self-aligning housings
- ◆ Ground check (pilot) system protection
- ◆ Accepts conductors to 500 MCM (250 mm²) and diameters up to 3.5" (90mm) *larger sizes available on request*
- ◆ Silver-plated male and female phase contacts with patented multilam contact band arrangement
- ◆ Epoxy Resin Phase Insulators
- ◆ Optional epoxy color coding for greater safety



Benefits

- ◆ Easy, on-site, front-end maintenance
- ◆ Fast and positive coupling and uncoupling
- ◆ Weatherproof covers
- ◆ Designed for superior coupler life
- ◆ Reduced installation time
- ◆ Industry-wide compatibility
- ◆ One person operation

Electrical Data

◆ Coupler voltage class	15.0 kV
◆ 1 minute dry withstand (AC)	50.0 kV
◆ 6 hour dry withstand (AC)	35.0 kV
◆ 15 minute dry withstand (AC)	75.0 kV
◆ Basic impulse level (BIL)	110.0 kV
◆ Corona extinction voltage (BIL)	13.0 kV
◆ Short circuit fault level	41.2 kA RMS

Data in accordance with IEEE 348-1975

To obtain a catalogue of Patton and Cooke products or listings of registered agents and distributors please contact us using the information below

FOR FURTHER INFORMATION:



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