



TIANCHENG ELECTRICAL MARINE EQUIPMENT PTE LTD

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Claims:

1. A master control system for barges used in marine construction, comprising:
 - An 8-point mooring winch system for stabilizing the barge by distributing tension across eight mooring lines.
 - A positioning system for providing real-time position data and ensuring the barge remains within the specified $\pm 300\text{mm}$ accuracy.
 - An environmental monitoring system for monitoring conditions such as wind, currents, and waves to adjust control algorithms.
2. The system of claim 1, wherein the control algorithms include PID control, model predictive control, adaptive control, sliding mode control, data-driven control, and nonlinear control to coordinate the operations of the mooring winches based on real-time data.
3. The system of claim 1, further comprising a control dashboard for operators to monitor and control the system, displaying real-time data, system status, and alerts.
4. The system of claim 1, further including manual override options for operators to take control in emergency situations.

Drawings:

(Include any relevant diagrams or drawings of the master control system, its components, and how they integrate with the barge and subsystems.)