

ROBOT CONFIGURATION SPECIFICATIONS

ChillStore Technologies Implementation

Document Reference: PDR-CONF-2023-114

Last Updated: December 15, 2023

1. OVERVIEW AND SCOPE

1. This Robot Configuration Specification ("Configuration Document") details the technical and operational parameters for Polar Dynamics Robotics, Inc.'s ("PDR") autonomous mobile robot deployment at ChillStore Technologies' cold storage facilities.
2. This document governs the configuration, deployment, and operation of PDR's CryoBot-X Series robots (Model CB-450) within temperature-controlled environments ranging from -30 C to +5 C.

2. DEFINITIONS

1. "IceNav System" refers to PDR's proprietary cold-environment navigation and control software (v4.2.1 or later).
2. "Thermal Management Module" means the integrated thermal regulation system (Part #TM-890X).
3. "Operating Environment" means ChillStore's designated cold storage zones as specified in Appendix A.

3. HARDWARE CONFIGURATION

1. Base Configuration

- Model: CryoBot-X (CB-450)
- Serial Number Range: CB450-2023-1001 through CB450-2023-1025
- Power System: Dual 48V lithium iron phosphate batteries (cold-rated)
- Payload Capacity: 800kg
- Operating Temperature Range: -30 C to +5 C

2. Thermal Protection Systems

- Arctic-grade actuator housing (Part #AH-567)

- Thermal barrier coating on external surfaces
- Heated sensor arrays with automatic defrost cycles
- Reinforced internal component insulation

4. SOFTWARE CONFIGURATION

1. Navigation System

- IceNav Core System v4.2.1
- Cold Environment Pattern Recognition Module
- Dynamic Path Planning with Frost Compensation
- Emergency Stop Protocol v2.3

2. Fleet Management Integration

- ChillStore WMS Integration Package v3.0
- Real-time Location System (RTLS) Configuration
- Traffic Management Protocol: CS-Standard-2023
- Collision Avoidance System: Enhanced Winter Protocol

5. OPERATIONAL PARAMETERS

1. Performance Specifications

- Maximum Speed: 1.8 m/s
- Turning Radius: 1.2m
- Minimum Aisle Width: 2.4m
- Battery Life: 12 hours continuous operation
- Charging Time: 45 minutes (rapid charge)

2. Safety Parameters

- Minimum Object Detection Distance: 3.0m
- Emergency Stop Distance: 0.5m
- Maximum Slope Operation: 3%
- Load Distribution Tolerance: 5%

6. MAINTENANCE REQUIREMENTS

1. Scheduled Maintenance

- Daily: Sensor cleaning and calibration check
- Weekly: Thermal system inspection
- Monthly: Full diagnostic scan and software updates
- Quarterly: Complete mechanical inspection

2. Environmental Adaptations

- Condensation prevention protocol implementation
- Anti-icing system activation thresholds
- Temperature transition management procedures

7. COMPLIANCE AND CERTIFICATION

1. The configuration detailed herein complies with:

- ANSI/RIA R15.06-2012 Safety Requirements
- ISO/TS 15066:2016 Robotics Safety Standards
- CE Marking Requirements for Cold Environment Operation
- UL 3300 Robot Safety Certification

8. WARRANTY AND SUPPORT

1. Configuration-Specific Coverage

- Hardware warranty: 24 months
- Software support: 36 months
- Technical support response time: 2 hours
- On-site service response: 24 hours

9. LEGAL NOTICES

1. Proprietary Information

This document contains confidential and proprietary information of Polar Dynamics Robotics, Inc. Any unauthorized use, disclosure, or reproduction is strictly prohibited.

2. Liability Limitation

PDR's liability related to this configuration shall be limited as specified in the Master Service

Agreement dated October 1, 2023.

10. AUTHORIZATION

APPROVED AND ACCEPTED:

POLAR DYNAMICS ROBOTICS, INC.

By:

Name: Dr. James Barrett

Title: Chief Robotics Officer

Date:

CHILLSTORE TECHNOLOGIES

By:

Name: [Authorized Representative]

Title: [Title]

Date: