

PDR-AMR-004 INTEGRATION MANUAL

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Classification: CONFIDENTIAL

1. INTRODUCTION

1 This Integration Manual ("Manual") is a proprietary document of Polar Dynamics Robotics, Inc. ("PDR") that governs the integration procedures for the PDR-AMR-004 autonomous mobile robot system ("AMR System") within authorized deployment environments.

2 This Manual is subject to PDR's Master Terms and Conditions and any applicable license agreements between PDR and the Integration Partner.

2. DEFINITIONS

1 "Authorized Environment" means temperature-controlled facilities operating between +25 C to -30 C that meet PDR's facility qualification requirements.

2 "IceNav(TM) Platform" refers to PDR's proprietary cold-environment navigation and control system.

3 "Integration Partner" means any entity authorized by PDR to perform AMR System integration services.

4 "Thermal Management System" or "TMS" refers to PDR's proprietary cold-resistant actuator and environmental control technology.

3. SYSTEM REQUIREMENTS

1 Environmental Parameters

- Operating Temperature Range: -30 C to +25 C
- Humidity Tolerance: 10% to 95% non-condensing
- Floor Surface Requirements: Non-slip, level surface (max 2% grade)
- Minimum Aisle Width: 2.4 meters

2 Power Requirements

- Input Voltage: 220-240VAC, 50/60Hz
- Charging Station: PDR-CS-200 Series or approved equivalent
- Emergency Power Backup: Minimum 30 minutes runtime

3 Network Infrastructure

- Wireless Network: IEEE 802.11ac
- Minimum Signal Strength: -65 dBm throughout operational area
- Network Latency: <50ms
- Reserved IP Range: Minimum /24 subnet

4. INTEGRATION PROCEDURES

1 Site Assessment

- Conduct PDR-approved site survey
- Document thermal zones and transition areas
- Map network coverage using PDR Site Mapping Tool
- Verify floor surface compliance

2 IceNav(TM) Platform Configuration

- Upload facility CAD drawings
- Define operational zones and restricted areas
- Configure thermal transition protocols
- Establish emergency response paths

3 TMS Calibration

- Initialize thermal sensors
- Calibrate actuator response curves
- Set environmental adaptation parameters
- Validate thermal management cycles

5. SAFETY PROTOCOLS

1 Emergency Systems

- Emergency stop buttons must be installed per PDR specification E-STOP-2023
- Safety light curtains required at zone transitions
- Audio-visual warning systems must meet PDR Standard AVW-100

2 Safety Certifications

- UL 1740 compliance required
- CE marking where applicable
- ISO 10218-1:2011 conformance
- Cold storage specific safety protocols per PDR-CSP-2023

6. TESTING AND VALIDATION

1 Required Testing Procedures

- Full thermal cycle testing
- Navigation accuracy verification
- Obstacle detection validation
- Emergency response timing
- Network failover testing

2 Performance Metrics

- Position accuracy: 5cm
- Navigation success rate: >99.9%
- Thermal response time: <2.5 seconds
- System availability: >98%

7. MAINTENANCE AND SUPPORT

1 Scheduled Maintenance

- Weekly system diagnostics
- Monthly thermal calibration
- Quarterly actuator inspection
- Semi-annual software updates

2 Technical Support

- 24/7 emergency support available
- Remote diagnostics capability required
- Minimum response time: 2 hours
- Onsite support within 24 hours

8. LEGAL NOTICES

1 This Manual contains confidential and proprietary information of PDR. Any unauthorized use, reproduction, or distribution is strictly prohibited.

2 PDR's IceNav(TM) Platform and Thermal Management System are protected by U.S. Patents 11,234,567 and 11,234,568 and other pending patent applications.

3 Integration Partners shall maintain appropriate insurance coverage as specified in the Master Services Agreement.

9. DOCUMENT CONTROL

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