

PDR-AMR-005 HARDWARE REFERENCE GUIDE

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Classification: CONFIDENTIAL

1. DOCUMENT PURPOSE AND SCOPE

1. This Hardware Reference Guide ("Guide") contains proprietary and confidential information regarding the hardware specifications, components, and technical requirements for Polar Dynamics Robotics, Inc.'s ("PDR") AMR-005 autonomous mobile robot system ("System").

2. This Guide is intended for authorized personnel only and is subject to the confidentiality provisions contained in Section 8 herein.

2. SYSTEM OVERVIEW

1. The AMR-005 is a ruggedized autonomous mobile robot designed for operation in temperature-controlled environments ranging from -30 C to +45 C.

2. Primary Hardware Components:

- Chassis: PDR-CT500 Cold-Resistant Frame
- Drive System: Dual IceTrac(TM) Motors (Model ITM-2024)
- Power System: Extended Cold Storage Battery Pack (ECSBP-400)
- Navigation: IceNav(TM) Sensor Array (ISA-24)
- Control Unit: Arctic-Grade Processing Module (APM-005)

3. TECHNICAL SPECIFICATIONS

1. Physical Dimensions

- Length: 1200mm
- Width: 900mm
- Height: 450mm
- Payload Capacity: 500kg
- Unladen Weight: 225kg

2. Performance Parameters

- Maximum Speed: 2.0 m/s
- Operating Temperature Range: -30 C to +45 C
- Battery Life: 12 hours continuous operation
- Charging Time: 2.5 hours (0% to 100%)
- Navigation Accuracy: 15mm

4. SAFETY SYSTEMS

1. Emergency Stop Mechanisms

- Physical E-Stop buttons (4 locations)
- Wireless E-Stop capability
- Automatic collision avoidance system

2. Safety Sensors

- 360 LiDAR coverage
- Proximity detection sensors (8 zones)
- Temperature monitoring system
- Battery management system

5. MAINTENANCE REQUIREMENTS

1. Scheduled Maintenance Intervals

- Daily: Visual inspection and sensor cleaning
- Weekly: Battery system diagnostics
- Monthly: Drive system inspection
- Quarterly: Full system calibration
- Annual: Comprehensive safety certification

2. Component Replacement Schedule

- Drive Motors: 5,000 operating hours
- Batteries: 1,000 charge cycles
- Sensors: 2 years or upon failure
- Control Unit: 3 years

6. COMPLIANCE AND CERTIFICATION

1. The System complies with the following standards:

- ISO 3691-4:2020 Industrial trucks
- EN 1525 Safety of industrial trucks
- IEC 60204-1 Safety of machinery
- IP65 Environmental Protection Rating

2. Required Certifications

- CE Marking (European Union)
- UL 1740 (North America)
- CSA-C22.2 No. 73 (Canada)

7. WARRANTY AND SUPPORT

1. Hardware Warranty

- Base System: 24 months
- Battery System: 12 months
- Extended warranty options available

2. Technical Support

- 24/7 remote support
- On-site service within 24 hours
- Spare parts availability guarantee: 5 years

8. CONFIDENTIALITY AND INTELLECTUAL PROPERTY

1. This Guide contains confidential and proprietary information of PDR. Recipients shall:

- Maintain strict confidentiality
- Limit access to authorized personnel
- Not reproduce without written consent
- Return or destroy upon request

2. All intellectual property rights in the System and this Guide are owned exclusively by PDR.

9. DOCUMENT CONTROL

1. Revision History

- Rev 2: January 15, 2024
- Rev 1: June 30, 2023
- Initial Release: January 10, 2023

2. Document Owner: Technical Documentation Department

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10. LEGAL NOTICES

1. This document is provided "as is" without warranty of any kind, either express or implied.
2. PDR reserves the right to modify specifications without notice.

APPROVED BY:

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