PDR-AMR-001 Base Platform Technical Specifications v2.1

CONFIDENTIAL AND PROPRIETARY

Polar Dynamics Robotics, Inc.

Effective Date: January 11, 2024

1. DOCUMENT CONTROL

1. This document supersedes and replaces version 2.0 dated October 15, 2023.

2. Distribution of this document is restricted to authorized personnel and subject to Non-Disclosure Agreement dated March 1, 2023.

2. BASE PLATFORM SPECIFICATIONS

1. Physical Specifications

- Dimensions: 1200mm (L) x 900mm (W) x 450mm (H)
- Unloaded Weight: 185 kg
- Maximum Payload Capacity: 750 kg
- Ground Clearance: 45mm
- Turning Radius: 0 (Zero-turn capability)

2. Operating Environment Parameters

- Temperature Range: -40 C to +45 C
- Humidity: 5% to 95% non-condensing
- IP Rating: IP65 (main chassis)
- Floor Condition Requirements: Smooth concrete, epoxy, or similar industrial surfaces
- Maximum Slope Operation: 5% grade

3. PROPULSION SYSTEM

1. Drive Configuration

- Quad-drive differential steering system
- Proprietary ColdTech(TM) actuators (Patent No. US 11,XXX,XXX)
- Thermal-managed brushless DC motors

- Regenerative braking capability

2. Performance Specifications

- Maximum Speed: 2.0 m/s
- Acceleration: 0.5 m/s
- Deceleration: 0.8 m/s
- Emergency Stop Distance: 300mm at full speed

4. POWER SYSTEM

1. Battery Specifications

- Type: Lithium Iron Phosphate (LiFePO4)
- Capacity: 48V, 200Ah
- Runtime: 12 hours (typical operation)
- Charging Time: 2.5 hours (10-90%)
- Cycle Life: >3,000 cycles

2. Charging System

- Input Voltage: 200-240VAC, 50/60Hz
- Maximum Charging Current: 40A
- Charging Protocol: CCS Type 2
- Auto-docking capability with IceNav(TM) guidance

5. NAVIGATION AND CONTROL

1. Sensor Suite

- 2x 3D LiDAR (270 FOV each)
- 8x Time-of-Flight sensors
- 4x RGB-D cameras
- IMU with temperature compensation
- Wheel encoders with anti-slip detection

2. IceNav(TM) Platform

- Localization Accuracy: 15mm

- Path Planning Update Rate: 10Hz
- Dynamic Obstacle Detection Range: 25m
- Cold-environment optimized SLAM algorithms
- Multi-robot coordination capability

6. SAFETY SYSTEMS

1. Emergency Systems

- 360 emergency stop buttons
- Remote emergency stop capability
- Automatic collision avoidance
- Load shift detection
- Thermal runaway protection

2. Compliance

- CE Marking (Machinery Directive 2006/42/EC)
- ISO 3691-4:2020
- ANSI/RIA R15.08-1-2020
- IEC 61496-1:2020
- EN 1525:1997

7. COMMUNICATION INTERFACES

1. Wireless Communications

- Wi-Fi 6 (IEEE 802.11ax)
- Bluetooth 5.2
- 4G LTE fallback
- Proprietary mesh networking

2. Integration Interfaces

- REST API
- WebSocket support
- OPC UA compatibility
- Custom protocol support via SDK

8. MAINTENANCE SPECIFICATIONS

1. Scheduled Maintenance Intervals

- Daily: Visual inspection
- Weekly: Sensor cleaning
- Monthly: Battery diagnostics
- Quarterly: Full system calibration
- Annual: Major service

2. Mean Time Between Failures (MTBF)

- Drive System: 15,000 hours
- Battery System: 20,000 hours
- Electronics: 25,000 hours
- Sensors: 30,000 hours

9. PROPRIETARY NOTICE

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10. DOCUMENT APPROVAL

APPROVED BY:

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Dr. James Barrett

Chief Robotics Officer

Polar Dynamics Robotics, Inc.

Date: January 11, 2024

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Marcus Chen

Chief Technology Officer

Polar Dynamics Robotics, Inc.

Date: January 11, 2024