

ROBOT PERFORMANCE STANDARDS

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Polar Dynamics Robotics, Inc.

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1. PURPOSE AND SCOPE

1. This document establishes the mandatory performance standards a

2. These standards apply to all Series-X and Series-Z AMR models d

2. DEFINITIONS

1. "Cold Environment" means any controlled environment operating a
2. "Critical Performance Metrics" means the essential operational para
3. "BlueCore(TM) System" means the Company's proprietary cold-res
4. "Standard Operating Conditions" means environmental conditions v

3. ENVIRONMENTAL OPERATING PARAMETERS

1. Temperature Range

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Minimum operating temperature: -40 C (-40 F)

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Maximum operating temperature: +5 C (+41 F)

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Temperature change tolerance: 5 C per hour

2. Humidity Requirements

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Operating humidity range: 15% to 90% RH, non-condensing

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Maximum condensation exposure: 30 minutes

3. Floor Conditions

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Maximum floor grade: 2%

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Surface friction coefficient: 0.3 minimum

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Maximum gap tolerance: 15mm

4. CRITICAL PERFORMANCE METRICS

1. Navigation Accuracy

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Positional accuracy: 25mm in any direction

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Rotational accuracy: 1 degree

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Path repeatability: 98% minimum

2. Power Systems

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Minimum runtime: 12 hours continuous operation

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Charging cycle: Maximum 2 hours

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Battery performance degradation: Maximum 15% after 1000 cycles

3. Payload Handling

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Maximum payload: As specified per model

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Load distribution variance: 5% from center

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Dynamic stability margin: 1.5 minimum

5. SAFETY REQUIREMENTS

1. Emergency Systems

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Emergency stop activation time: <100ms

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Obstacle detection range: 2.5m minimum

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Fail-safe engagement: Immediate upon system fault

2. Monitoring Systems

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System health reporting frequency: Every 60 seconds

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Error condition reporting: Real-time

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Data logging retention: 30 days minimum

6. PERFORMANCE VALIDATION

1. Testing Requirements

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Full system validation every 1000 operating hours

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Environmental stress testing quarterly

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Safety system verification monthly

2. Certification

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All units must maintain current CE certification

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ISO/TS 15066 compliance required

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Model-specific UL certification as applicable

7. MAINTENANCE STANDARDS

1. Scheduled Maintenance

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Level 1 inspection: Every 500 operating hours

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Level 2 service: Every 2000 operating hours

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Full system overhaul: Every 8000 operating hours

2. Component Replacement

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Critical components: As specified in maintenance manual

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Wear items: Based on inspection results

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Software updates: Within 30 days of release

8. COMPLIANCE AND REPORTING

1. Performance Monitoring

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Daily operational metrics collection required

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Monthly performance analysis

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Quarterly trend analysis and reporting

2. Non-Compliance Handling

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Immediate notification of critical deviations

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24-hour resolution timeline for major issues

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Documentation of all remediation actions

9. DOCUMENT CONTROL

1. This document shall be reviewed and updated annually or upon sig

2. All modifications require approval from:

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Chief Technology Officer

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Chief Robotics Officer

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Quality Assurance Director

10. AUTHORIZATION

This document is authorized and approved by:

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Marcus Chen

Chief Technology Officer

Date: January 1, 2024

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Dr. James Barrett

Chief Robotics Officer

Date: January 1, 2024

11. LEGAL NOTICE

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