ROBOT MAINTENANCE SAFETY PROCEDURES MANUAL

Polar Dynamics Robotics, Inc.

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1. INTRODUCTION AND SCOPE

1. This Robot Maintenance Safety Procedures Manual ("Manual") establishes mandatory safety protocols for the maintenance, repair, and servicing of all Polar Dynamics Robotics, Inc. ("PDR") autonomous mobile robots ("AMRs"), with particular emphasis on cold-environment operations.

2. This Manual applies to all PDR employees, authorized service providers, and certified maintenance personnel performing work on PDR AMR systems, including the IceNav(TM) platform and associated subsystems.

2. DEFINITIONS

1. "Authorized Personnel" means individuals who have completed PDR's Advanced Robotics Safety Certification Program and maintain current certification status.

2. "Cold Environment Operations" refers to any maintenance activities conducted in environments below 0 C (32 F).

3. "Critical Safety Systems" includes, but is not limited to, emergency stop mechanisms, thermal management systems, collision avoidance sensors, and safety-rated actuator controls.

3. GENERAL SAFETY REQUIREMENTS

1. Certification Requirements

- All maintenance personnel must maintain current PDR safety certification
- Annual recertification required for cold environment specialization
- Documentation of certification must be available upon request

2. Personal Protective Equipment (PPE)

- Category III cold-protective clothing for sub-zero environments

- Electrical safety gloves rated for -40 C operations
- Safety glasses with anti-fog coating
- ESD-compliant footwear
- Emergency thermal protection equipment

4. MAINTENANCE PROCEDURES

1. Pre-Maintenance Safety Checks

a) Verify complete power isolation

b) Confirm thermal system shutdown

c) Execute IceNav(TM) system diagnostic sequence

d) Document environmental conditions

e) Verify emergency response system availability

2. Cold Environment Specific Procedures

a) Monitor ambient temperature throughout maintenance

b) Implement cold-weather tool protocols

c) Observe maximum exposure time limits

d) Maintain thermal management system integrity

e) Follow condensation prevention procedures

5. EMERGENCY PROTOCOLS

1. Emergency Shutdown Procedures

- Immediate power disconnection protocol
- Thermal system emergency purge sequence
- Emergency communications procedures
- Facility evacuation coordination

2. Accident Response

- First aid procedures specific to cold environments
- Incident reporting requirements
- Emergency contact sequence
- Documentation requirements

6. COMPLIANCE AND DOCUMENTATION

1. Required Documentation

- Maintenance activity logs
- Safety inspection checklists
- Incident reports
- Certification records
- Equipment calibration records

2. Regulatory Compliance

- OSHA standard 1910.147 compliance
- ISO/TS 15066:2016 adherence
- ANSI/RIA R15.06-2012 compliance
- State-specific safety regulations

7. LIABILITY AND INDEMNIFICATION

1. PDR assumes no liability for injuries or damages resulting from failure to follow safety procedures outlined in this Manual.

2. Maintenance personnel agree to indemnify PDR against claims arising from procedural violations or unauthorized modifications.

8. UPDATES AND REVISIONS

1. This Manual is subject to update based on:

- Regulatory changes
- Technology advances
- Safety incident findings
- Best practice evolution

2. All personnel must acknowledge receipt of updates within 5 business days.

9. CERTIFICATION

The undersigned hereby acknowledges receipt and understanding of this Manual and agrees to

comply with all procedures contained herein.

Name: _

Title: _

Date: _

Certification #: _

APPROVAL

APPROVED BY:

_

Dr. Elena Frost

Chief Executive Officer

Polar Dynamics Robotics, Inc.

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Dr. James Barrett

Chief Robotics Officer

Polar Dynamics Robotics, Inc.

Date: January 15, 2024

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