PDR-OPS-026 PRODUCTION QUALITY METR

Version 2.4 | Effective Date: January 15, 2024

Document Classification: Confidential - Internal Use Only

1. PURPOSE AND SCOPE

1. This document establishes the mandatory quality control metrics, te

2. These standards apply to all production facilities manufacturing Blu

2. DEFINITIONS

1. "Cold Units" refers to any Company autonomous mobile robot incor

2. "Critical Components" includes, but is not limited to:

a) BlueCore(TM) navigation modules

b) Temperature-hardened power systems

c) Cold-resistant actuators

d) Reinforced chassis components

e) Environmental sealing systems

3. "Quality Event" means any deviation from specified performance pa

3. PRODUCTION QUALITY REQUIREMENTS

1. Component Testing

1.1. All Critical Components must undergo individual testing at -30 C (

1.2. Power systems must demonstrate >95% rated capacity at -25 C (

1.3. Navigation modules must achieve <2cm positioning accuracy at t

2. Assembly Quality Controls

2.1. Torque specifications must be verified using calibrated tools.

2.2. Environmental seals must be pressure tested to 2.0 bar.

2.3. All electrical connections must undergo thermal cycling verificatio

3. System Integration Testing

3.1. Completed units must pass 72-hour continuous operation test at

3.2. Navigation accuracy must maintain 1.5cm throughout testing per

3.3. Power consumption shall not exceed 110% of baseline specificat

4. QUALITY METRICS AND ACCEPTANCE CRITERI

1. Production Yield Requirements

1.1. First pass yield must exceed 92% for all production batches.

1.2. Final acceptance rate must exceed 97% after rework.

1.3. Critical Component rejection rate must not exceed 3%.

2. Performance Metrics

2.1. Mean Time Between Failures (MTBF) >5000 hours at -20 C.

2.2. Battery cycle life >1000 cycles at rated capacity.

2.3. Positioning accuracy drift <0.5cm per 24 hours of operation.

3. Documentation Requirements

3.1. All test results must be recorded in Company's quality manageme

3.2. Component traceability must be maintained for minimum 5 years.

3.3. Quality Events must be documented within 24 hours of occurrenc

5. NON-CONFORMANCE MANAGEMENT

1. Any Quality Event must trigger immediate production hold for affect

2. Root cause analysis must be completed within:

2.1. 24 hours for Critical Component failures

2.2. 48 hours for system integration issues

2.3. 72 hours for performance degradation issues

3. Corrective actions must be validated through testing before product

6. QUALITY ASSURANCE OVERSIGHT

1. Quality assurance personnel must be certified in cold environment

2. Monthly quality metrics reports must be submitted to senior manag

3. Quarterly quality system audits must be performed by independent

7. DOCUMENT CONTROL

1. This document must be reviewed annually and updated as needed.

2. Changes require approval from:

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Chief Technology Officer

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Chief Robotics Officer

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Director of Quality Assurance

3. Version history must be maintained in document control system.

8. LEGAL COMPLIANCE

1. These requirements supplement all applicable regulatory standards

2. Compliance with ISO 9001:2015 and relevant robotics safety stand

9. PROPRIETARY INFORMATION NOTICE

APPROVAL AND IMPLEMENTATION

APPROVED BY:

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Date: January 15, 2024

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Date: January 15, 2024

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Date: January 15, 2024