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Title	Substation Inspection Robot
Description	For medium- and high-voltage substations, enabling autonomous patrols, multi-sensor inspection, and real-time fault detection

🌐 Substation Inspection Robot — One-Pager (English Version)

Autonomous Robotics for Power Infrastructure · High Reliability · AI-Driven Inspection

Substation Inspection Robot

Autonomous Patrol · Intelligent Fault Detection · Designed for High-Voltage Environments

The Substation Inspection Robot is engineered for **medium- and high-voltage substations**, enabling autonomous patrols, multi-sensor inspection, and real-time fault detection.

With thermal imaging, LiDAR navigation, partial discharge detection, and integration with Inspur AI cloud, the robot significantly enhances the reliability, safety, and efficiency of substation O&M.

CORE HIGHLIGHTS

- **Autonomous navigation in complex substation environments**
- **LiDAR + SLAM mapping** for high-precision route planning
- **Thermal imaging** for hot-spot detection
- **Ultrasonic / UHF sensors** for partial discharge detection
- **High-definition camera** for insulator, switchgear, indicator inspection
- **Weather-resistant industrial chassis (IP54–IP65)**
- **Built-in AI models** for defect recognition and abnormal condition alarms
- **Compatible with SCADA, EMS, DMS, and Inspur cloud platform**

APPLICATION SCENARIOS

1. Routine Autonomous Patrols

Robot conducts regular inspections of:

- GIS / AIS switchgear
- Transformers
- Circuit breakers
- Busbars
- Insulators
- Protection cabinets

Value: Consistent, repeatable, standardized inspections without manpower.

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2. Thermal Abnormality Detection

Identifies:

- Loose connections
- Overheating transformers
- Faulty bushings
- Cable junction temperature rise

Value: Prevents early-stage failures and unplanned outages.

3. Partial Discharge Monitoring

Using **ultrasonic + UHF** sensors to detect:

- Surface discharge
- Internal insulation discharge
- Corona discharge

Value: Improves electrical reliability and reduces catastrophic failure risks.

4. Security Surveillance for Substations

Supports:

- Motion detection
- Intrusion alarms
- Real-time monitoring

Value: Enhances perimeter and equipment safety.

TECHNICAL SPECIFICATIONS

Item	Specification
Navigation	LiDAR SLAM + GPS (optional)
Imaging	4K visible camera + thermal imaging
PD Detection	Ultrasonic + UHF
Communication	4G/5G, WiFi, optional wired docking
Ingress Protection	IP54–IP65
Battery Life	Multi-hour continuous operation
Charging	Auto-docking charging station
Control	Autonomous patrol + remote manual control

VALUE TO POWER UTILITIES

- Reduces manpower cost for routine inspection
- Minimizes operator exposure to high-voltage risk
- Real-time alerts of thermal or electrical anomalies
- AI-generated reports improve audit quality
- Enhances grid reliability and reduces O&M spending
- Supports smart-grid transformation and automation

变电站巡检机器人 — 一页纸（中文正式版）

变电站巡检机器人

自主巡检 · 智能识别 · 面向高压场景的专业电力巡检解决方案

变电站巡检机器人专为 **中高压变电站**设计，用于替代人工巡检并实现数据标准化、智能化分析与远程监控。

机器人配备 **激光雷达、高清摄像头、红外热成像、超声/特高频局放检测**等多种传感器，全面覆盖变电站精细化运维需求。

核心亮点

- **复杂变电站环境中的自主导航能力**
- 配备 **LiDAR + SLAM**，实现精准建图与巡检路线规划
- **热成像识别热点异常**
- **超声/特高频局放检测**可识别多类绝缘缺陷
- **高清摄像头**可检查绝缘子、断路器、指示灯等设备状态
- *工业级防护（IP54–IP65）**适应户外风沙与高温场景
- 可接入 **浪潮云平台与AI模型**进行智能诊断
- 可与 **SCADA / EMS / DMS** 系统一键联动

典型应用场景

1. 日常自主巡检

巡检对象包括：

- GIS/AIS 开关设备
- 变压器
- 断路器
- 母排系统
- 绝缘子
- 保护及控制柜
- *价值：**标准化巡检流程、降低人力成本，提高巡检频率。

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2. 热点异常检测

识别：

- 接头温升
- 变压器发热
- 套管局部异常
- 电缆接头热缺陷
- *价值：**提前诊断故障，减少非计划停电。

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3. 局部放电检测

通过 **超声 + 特高频** 传感器识别：

- 表面放电
- 内部绝缘放电
- 电晕放电
- *价值：**提升电力设备健康管理的准确性。

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4. 安防巡逻

支持：

- 移动安防
- 视频监控
- 侵入报警
- *价值：**提升变电站整体安全等级。

技术参数

项目	参数
导航方式	激光雷达 SLAM + GPS（可选）
成像系统	4K 可见光摄像头 + 红外热成像
局放检测	超声波 + 特高频
通信方式	4G/5G、WiFi、可选有线对接
防护等级	IP54–IP65
续航能力	多小时连续工作
充电方式	自动回充底座
控制模式	自主巡检 + 远程手动控制

为电力系统带来的价值

- 降低现场人员暴露在高压环境中的风险
- 提升巡检频率与数据质量
- 热点与局放异常可实时告警
- AI 自动生成巡检报告
- 降低运维成本，提升电网稳定性
- 支持电力系统数字化、智能化升级