Waste Sorting Robot – Technical Datasheet

System Overview

The Waste Sorting Robot is an AI-powered, vision-guided robotic system designed for automated sorting of mixed waste streams in recycling facilities and MRFs. It combines real-time AI vision, industrial robotics, and vacuum-based gripping for reliable, non-destructive operation.

Key Performance Parameters

- **Duty Cycle:** 24×7 continuous industrial operation
- **Sorting Throughput:** Up to **1 pick per second** per robot (application dependent)
- **Sorting Accuracy:** >95% material identification accuracy (stream dependent)

Robotic Motion & Control

- **Motion Planning:**
  • Conveyor-synchronized picking
  • Pick-on-the-fly operation (real-time trajectory planning)
- **Control Integration:**
  • Compatible with standard industrial PLCs and controllers

Vacuum-Based Gripping

- **Gripping Mechanism:**
  • Vacuum-based suction gripping

- Soft-contact, non-marking handling

- **Material Handling Capability:**
  - Plastic bottles, containers, broken items, crushed objects, cups
  - Paper, cardboard, and lightweight flexible packaging
  - Select glass and metal objects (application dependent)

- **End-Effector Design:**
  - Industrial-grade suction cups
  - Configurable layouts based on object size and waste stream
  - Designed for uneven, curved, and partially crushed objects

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Payload Capacity

- **Maximum Payload:**
  - Up to **2.5 kg** per pick (application dependent)

- **Recommended Operating Payload:**
  - 0.05 kg – 1.5 kg for optimal speed and accuracy

Power & Utility Requirements

- **Electrical Power Requirement:**
  - **6 kW** (total connected load)

- **Pneumatic / Compressed Air Requirement:**
  - **8 bar** supply pressure
  - **1000 LPM** air flow (clean, dry, industrial-grade air)

Physical Specifications

- **Robot Cell Footprint:**
  - Approx. **1200 mm × 1200 mm** (excluding conveyor)

- **Overall System Height:**
  - Approx. **2200 mm** (including robot and mounting structure)

- **System Weight:**
  • Approx. **350–500 kg** (configuration dependent)

Safety & Material Protection

- **Handling Characteristics:**
  • Non-destructive handling
  • Minimizes deformation and surface damage
  • Suitable for fragile and lightweight materials

Data & Analytics

- **Performance Metrics:**
  • Picks per hour
  • Material-wise recovery rates
  • Purity and contamination tracking

- **Traceability:**
  • Material-level data logging
  • Compliance and reporting ready

System Integration & Scalability

- **Deployment:**
  • Integrates with existing conveyor systems
  • Modular, scalable architecture

- **Monitoring:**
  • Centralized monitoring via cloud dashboard

Industrial Readiness

- **Reliability:**
  • Designed for continuous industrial operation

- Low-maintenance gripping and motion systems

Specifications are indicative and may vary based on configuration and application.
