SOUTHERN MACHINERY

How It Works: A Technical Deep Dive into the SME-5200 Pallet Cleaning Machine

An essential guide for SMT Technicians.

Southern Machinery | SMThelp.com

Engineered for Peak Performance in Wave Soldering Environments

- The SME-5200 is an automated, high-performance system specifically designed to clean flux residuals and solder balls from wave soldering pallets.
- It utilizes a multi-stage process with water-base cleaning liquid to ensure pallets are 100% clean and dry, improving production quality and efficiency.

Key Applications:

- Reflow/Wave oven fixtures (Composite stone, Steel, Aluminum)
- Coolers, filters, chains, and other machine parts with flux contamination.

AT A GLANCE

- **Construction**: Total SUS304 Stainless Steel
- **Control**: Mitsubishi PLC + Touch Panel Interface
- **Process**: Fully Automated Batch Cleaning

The Automated Three-Stage Process for a Perfect Clean

1. LOAD & WASH

Pallets are loaded into the rotating basket. High-pressure, heated cleaning liquid is sprayed from all angles to remove flux.

2. RINSE

A separate, dedicated system rinses the pallets with heated tap water to remove any remaining cleaning agent.

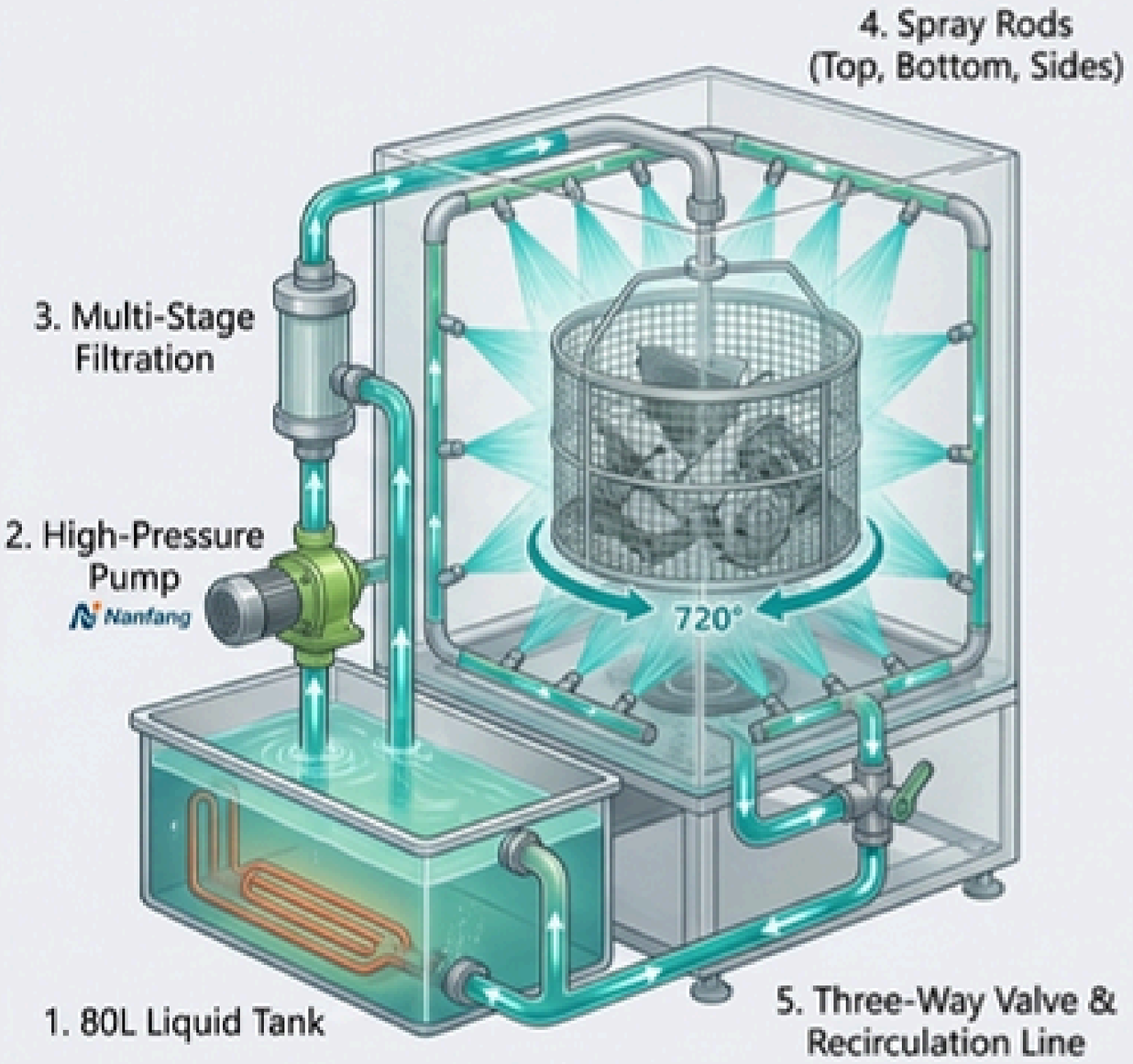
3. DRY & UNLOAD

High-pressure hot air is blasted through air knives to completely dry the pallets before they are removed.

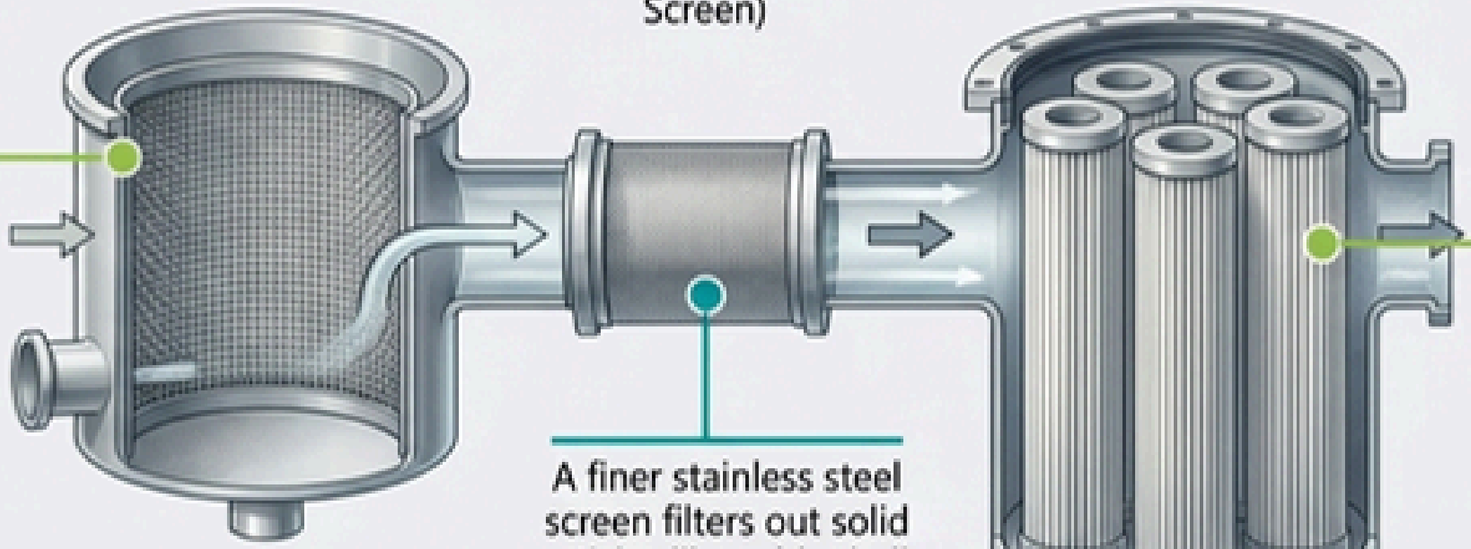
Each stage is powered by a dedicated, intelligent system designed for maximum effectiveness and reliability.

The Wash System: High-Pressure Liquid and Multi-Angle Attack

1. **80L Liquid Tank**
   Holds the water-base cleaning liquid. Equipped with a 9KW heater to raise the temperature to a set point (typically 40-50°C, max 80°C).
2. **High-Pressure Pump**
   A Nanfang CDLF4-12 pump draws the heated liquid from the tank.
3. **Multi-Stage Filtration**
   Liquid is forced through an in-line filtration system to remove contaminants before spraying. (This will be detailed on the next slide).
4. **720° Spray Coverage**
   The pressurized liquid is sprayed through dedicated spray rods at the top, bottom, and side of the cleaning chamber, ensuring complete coverage as the basket rotates.
5. **Recirculation**
   Used liquid flows back to the tank via a three-way valve for reheating and recirculation, maximizing liquid lifespan.



Maintaining Performance: The Three-Stage Cleaning Filtrating Filtration System

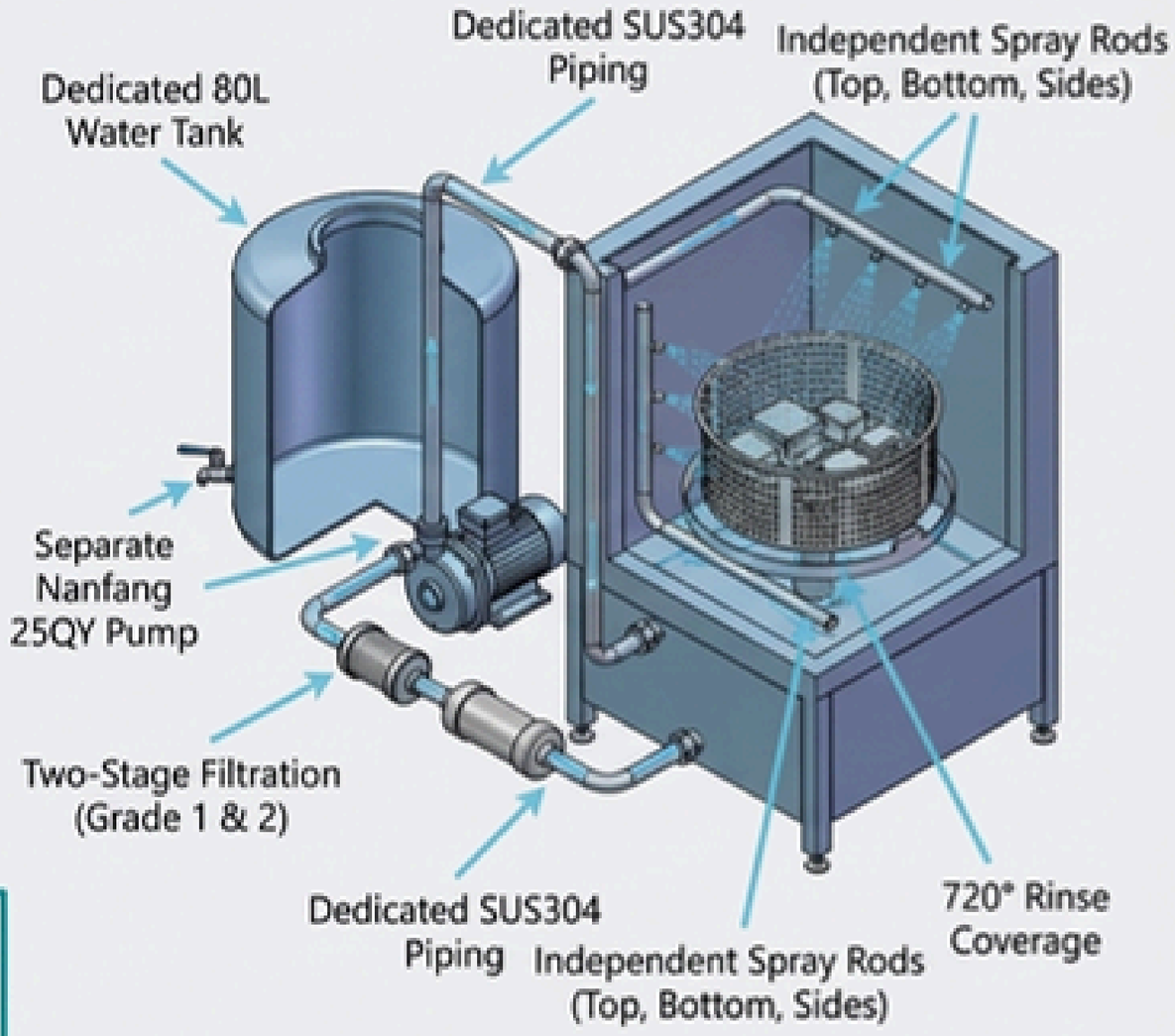


Technician's Note: This system significantly extends the life of the cleaning liquid and is a key factor in consistent cleaning results. The pressure monitoring system will alert you when the 20µm filter elements require replacement.

The Rinse System: Ensuring a Residue-Free Finish

Key Design Features:

- **Dedicated 80L Water Tank:** Uses tap water, **completely separate** from the cleaning liquid tank to prevent cross-contamination.
- **Independent Pump & Piping:** A separate Nanfang 25QY pump and dedicated SUS304 pipe system ensure **no cleaning agent is introduced** during the rinse cycle.
- **Two-Stage Filtration:**
  - Grade 1: 2mm screen for pump protection.
  - Grade 2: 100μm stainless steel screen for solid particles.
- **720° Rinse Coverage:** Utilizes its own set of three spray rods (top, bottom, side) for a thorough rinse.

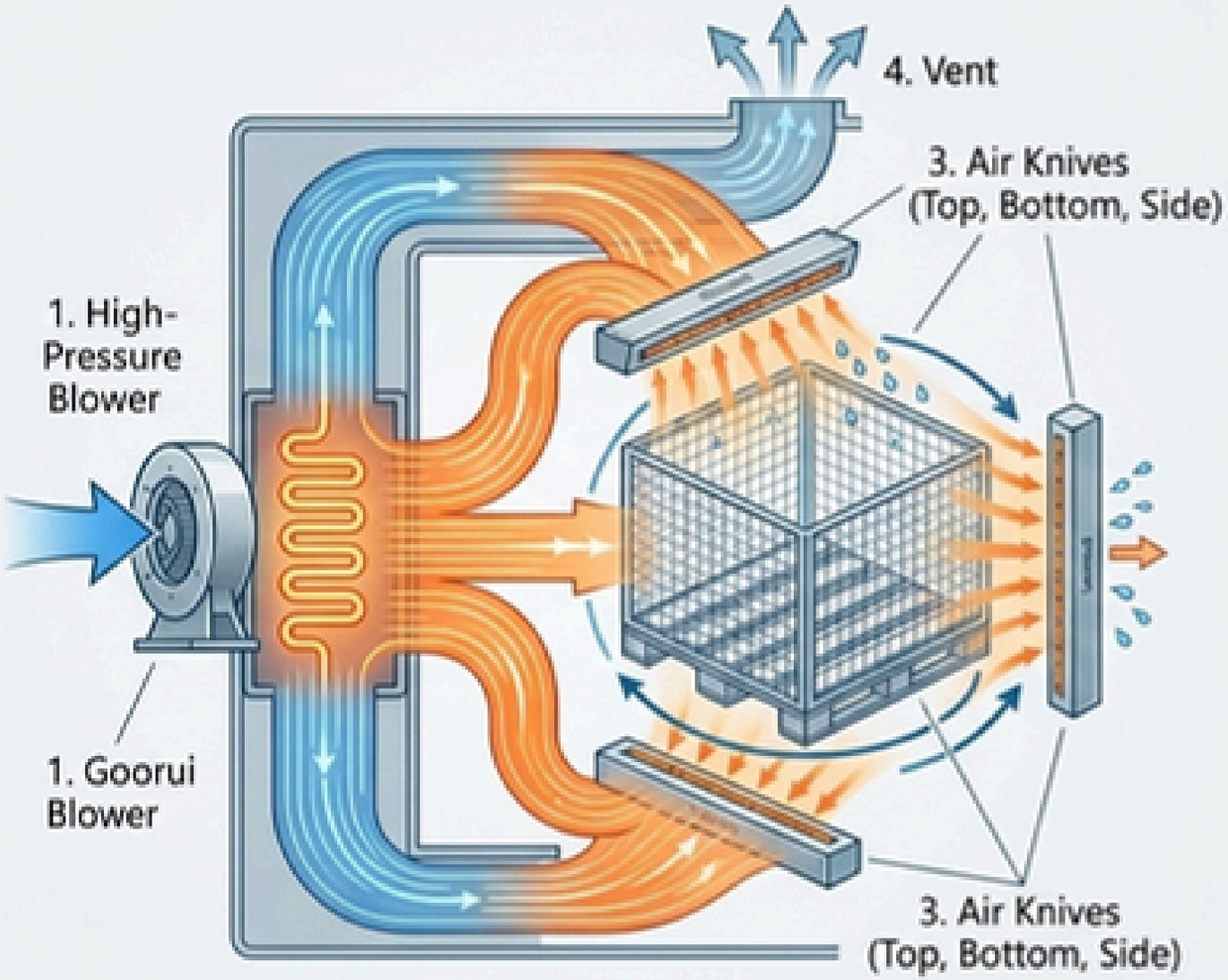


Why this matters: A completely separate rinse system is critical for preventing ionic contamination and ensuring a perfectly clean surface ready for the production line.

The Drying System: High-Volume Hot Air for Rapid Drying

System Components:

1. **High-Pressure Blower**: A Goorui 3.7KW blower generates a large volume of high-velocity air.
2. **Air Heater**: A 9KW heater raises the air temperature to the set point (typically 80-90°C) for maximum evaporative efficiency.
3. **Air Knives:** Three strategically placed air knives (top, bottom, side) focus the hot air into high-pressure sheets, effectively blasting water off the pallet surfaces and out of crevices.
4. **Vent:** A ¢120mm vent extracts moist air from the chamber.



Result: Pallets are completely dry and ready for immediate reuse, minimizing downtime.

The Control Center: Precision and Flexibility with Mitsubishi PLC

Core Components

- **Controller:** Mitsubishi FX3U-64MR PLC for robust and reliable process automation.
- **Interface:** Mitsubishi GS2107-WTBD Touch Panel (HMI) for clear visualization and intuitive operation.
- **Drives & Relays:** High-quality components from Mitsubishi (Inventor) and Schneider (Contactors, Relays) ensure system stability.

Operator Interface Highlights

- **One-Key Operation**: Select a pre-set program and press 'Start' for a fully automated cycle.
- **Real-Time Status**: The main screen displays current values (PV) vs. set values (SV), process timers, tank levels, and system status at a glance.
- **Multi-Language Support**: Interface is switchable between English and Chinese.

Fine-Tuning Your Process: Recipe Creation and Parameter Settings

Customizable Recipes:

- Store up to **10 unique cleaning recipes**.
- Easily select the desired recipe number from the main "Auto Menu".
- **Password** protected for authorized access: **147369**.

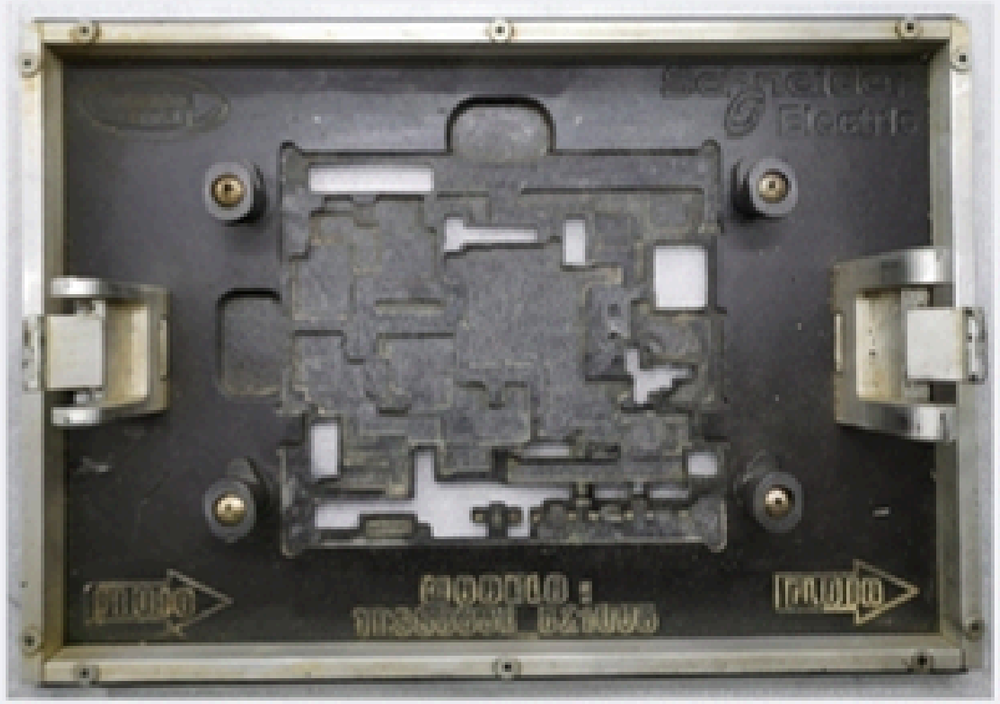
Adjustable Parameters per Recipe:

- **Clean Time** (1-3600s) & **Temperature** (0-80°C)
- **Rinse Time** (1-3600s) & **Temperature** (0-80°C)
- **Dry Time** (1-3600s) & **Temperature** (0-99°C)
- **Basket Turn Speed** (e.g., 15-20 r/min)
- **Air Blow Times** (after clean and after rinse)

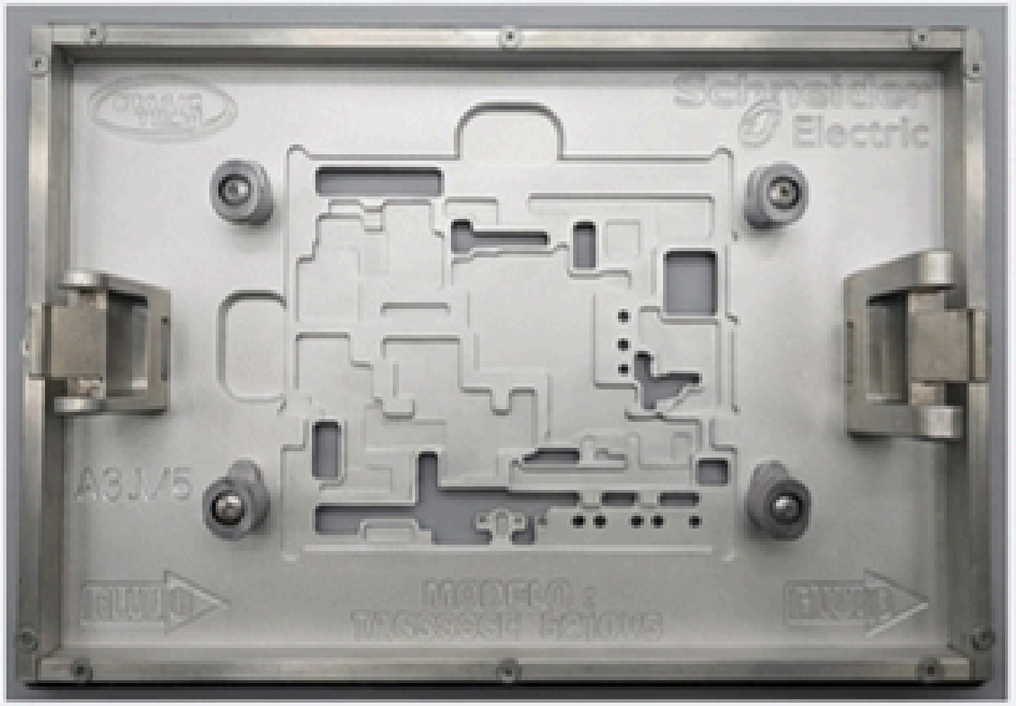
Advanced Settings: The 'Setting Menu' allows adjustment of pressure limits, triggering alarms if spray pressure is too low (filter/nozzle clog) or too high.

The Proof: Real-World Results from the Schneider Electric Test

BEFORE



AFTER



Test Overview:

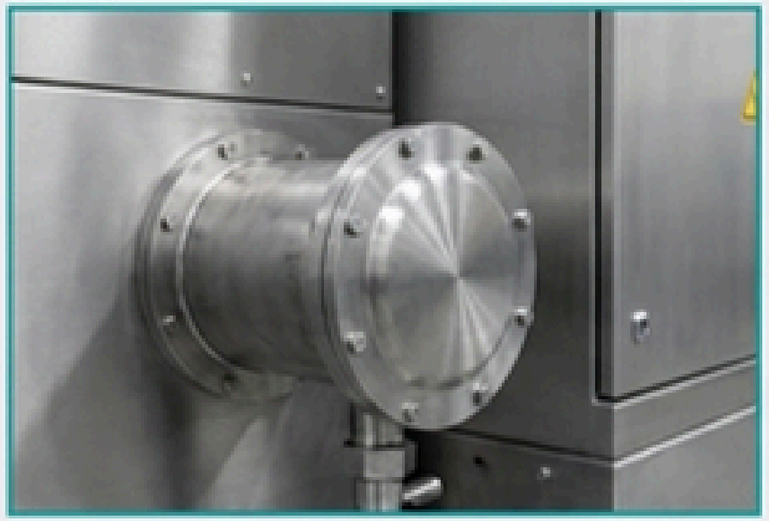
- **Client**: Schneider Electric
- **Contaminant**: Heavy, baked-on flux residue.
- **Cleaning Agent**: CTC-300 (water-based) at 20% concentration.

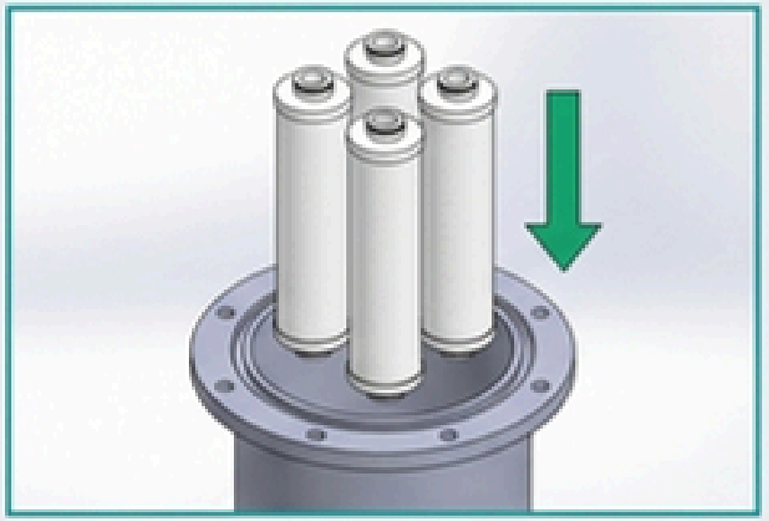
Process Parameters Used:

- **Clean**: 600s at 50°C
- **Rinse**: 120s at 30°C
- **Dry**: 720s at 80°C

Report Conclusion: *"We have removed completely the flux residues from most of the pallets... and significantly improved the cosmetic of the pallets giving them a bright finishing."*

Designed for Uptime: Simple and Direct Maintenance





Primary Maintenance Task: Filter Element Replacement

- **Indication**: A 'Lower limit of cleaning pressure' alarm on the HMI typically indicates clogged filters.

- **Process**:

1. Stop the machine and release system pressure using the drain valve.
2. Loosen the 6 fixing screws and remove the top cover of the filter barrel.
3. Remove the 5 used 20µm filter elements.
4. Clean any sediment from the bottom of the barrel.
5. Install 5 new elements, ensuring the top caps and O-ring seal are properly seated.
6. Replace the cover and tighten the screws.

Other Key Checks

- **Nozzles**: Periodically check for blockages. A 'high pressure' alarm can indicate clogged nozzles.
- **Tank Screens**: Clean the stainless steel filter screens in the wash and rinse tanks monthly.

SME-5200 at a Glance: Key Specifications and Components

Technical Specifications

- **Basket Size:** ¢1000 mm x H200mm
- **Max Pallet Height:** 450mm
- **Liquid/Water Tank Capacity:** 80L each
- **Machine Dimensions:** 1400mm(L) × 2000mm(W) × 1500mm(H)
- **Net Weight:** approx. 600Kg
- **Power Supply:** AC380V 50HZ 63A (Total 33KW)
- **Air Supply:** 0.5 ~ 0.7 Mpa, 400~600 L/Min
- **Filter Accuracy:** 20μm

Core Components (Brand Transparency)

- **PLC & HMI:** Mitsubishi
- **Inverter:** Mitsubishi
- **Contactors & Relays:** Schneider
- **Solenoid Valves:** CKD
- **Power Supply Unit:** OMRON
- **Pumps:** Nanfang
- **Blower:** Goorui
- **Diaphragm Pump:** ARO

SOUTHERN MACHINERY

Your Partner in Manufacturing Excellence

For Technical Support & Inquiries

Website
www.smthelp.com

Email
info@smthelp.com

Phone
+86-755-83203237

Resource Center

Full Machine Catalogs & Manuals
file.autoinsertion.com

High-Resolution Product Gallery
ph.smthelp.com

Machine Working Videos
YouTube - Auto Insertion