Spray Master Technologies
Central System
Technical Overview

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Overview

The following are the two most common central system configurations:

- **600 Systems** are commonly used in inside applications such as restaurants, kennels/shelters, penal facilities, etc. The pressure generated at the sprayer will wash, sanitize, and clean without damaging grout, tile, or cement.

- **2000 Systems** are commonly used in outside applications such as fast food and service/convenient centers. This system produces a higher pressure for cleaning walkways, drive-through, and parking areas. These systems can also be used on the inside bathrooms and kitchen areas with the use of larger sprayer nozzles providing lower pressures.

The pump and motor configurations determine the pressure at the sprayer. Review “System Pressure” in this document.

There are both “rack mounted” and “wall mounted” configurations for the SMT systems. The system presented in this document is “rack mounted”. The basic functionality of each style is the same.
System Pressure

SMT systems are pressure washer systems. When the sprayer is triggered the pressure obtained through the sprayer nozzle is a combination of the nozzle size and the volume of water being pushed through the system by the motor/pump combination. The nozzle size is matched to the motor/pump output to obtain the desired pressure. For this reason, it is important to always know the model of the central system when ordering sprayer and/or nozzle replacements. Review “System Components – Accessories” for a list of nozzle sizes by system configuration.

When the sprayer is not triggered, the Unloader Valve opens to allow water to flow back to the Reservoir. The Unloader Valve prevents excessive pressure buildup which could damage the system. The valve is preset at the factory and should not be adjusted by untrained personnel. Review the diagram below for pressure settings by system configuration.

There are a number of conditions that may cause an undesirable results in pressure. For example, small leaks can reduce the pressure at the nozzle. Pin-holes in the hose or a leaking hose or gun connections can dramatically reduce pressure. Also, the Unloader Valve being out of adjustment or the Bleeder Valve being partially or completely opened can cause differences in expected pressure.

The diagram below lists the most common system configurations and associated pressure ratings. Some central systems are custom configured to suit specific needs of the customer and may differ from these pressure ratings.

600 System – 2.2 GPM pump - 1000 PSI at sprayer - 1100 PSI at Unloader
2.9 GPM pump - 800 PSI at sprayer - 850 PSI at Unloader
2000 System – 3.2 GPM pump - 1850 PSI at sprayer - 2000 PSI at Unloader
System Components

Master Control Panel
Pressure Gauge
Reservoir
(Boot Tank)
Thermal Limit Switch
Float Level Switch
(inside reservoir)
Chemical Solenoid

Chemical Pumps
(not shown)
Accessories
(sprayers/hoses/hardware)

Tubing & Wiring
Bleeder Valve
Line Pressure Relief Valve
Unloader Assembly
Motor
Hydraulic Pump & Manifold
Filters
Remotes

Click on the component names to review part numbers and purpose.
System Components — Master Control Panel

Spade connectors for remote wire circuit
(Red, Brown, Green, Black, White from top to bottom. The blue wire is not used)

300-2861 – Transformer
(24VAC/40VA – 208/230volt)

300-2849 – 1/4amp Fuse
(slow blow for 208/230volt system)

300-2887 – Ice Cube Relay
(controls ancillary systems such as chemical pumps, flow switches, thermal switches, etc.)

300-3790 – Timer Relay
(activates pressure relief valve for 3 seconds when the system is turned off at the remote to relieve pressure in the lines).

200-1025 – Circuit Breaker (3amp)

Power LED
(Indicates source power is “ON”. If not illuminated, check the main circuit breaker and “Service Disconnect Switch”).

300-1919 – Motor control Contactor
(24VAC coil – 30amp)
System Components - **Motor**

There are three basic motors for the central system and are pre-wired for either 115, 208, or 230 volt systems.

- **300-0040** – 600 System - 115 volt
- **300-0041** – 600 System - 208-230 volt
- **300-0042** – 2000 System - 208-230 volt
System Components – Hydraulic Pump and Manifold

There are four basic pumps for Central Systems:

- **600 Systems** – 2.2GPM (Part# 300-2582)
  2.9GPM (Part# 300-2583)
- **2000 Systems** – 3.2GPM (Part# 300-2584)
  4.0GPM (Part# 300-1641)

Common parts are:

- **300-3545** – Oil Fill Cap
- **300-2699** – Oil Level Gauge
- **300-1225** – Oil Drain Cap
- **300-3603** – Manifold Seal Kit (2.2 & 2.9GPM)
- **300-3587** – Manifold Seal Kit (3.2 & 4.0GPM)
- **300-3599** – Manifold Valve Kit (2.2 & 2.9GPM)
- **300-3586** – Manifold Valve Kit (3.2 & 4.0GPM)
- **300-3543** – Oil, ISO 68, 21oz
- **300-3586** – Oil, ISO 68, 2.5gal

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The pressure gauge displays the amount of hydraulic pressure in pounds per square inch (PSI) that is present at the high pressure side of the pump.

When the system is initially turned on, the needle of the pressure gauge should **temporarily** jump to the PSI that is calibrated for the system and then drop to zero.

When a sprayer is triggered, the needle will jump to the PSI of the sprayer nozzle and stay there until the trigger is released at which time the needle will drop back to zero.

Review the “System Hydraulics” video in this document for an explanation of the relationship between the pressure in the line and the Unloader Valve during sprayer operation.
The water filters protect the system from debris and some chemical buildup. The filters should be checked and replaced on a periodic basis depending on water conditions of the facility (see “Periodic Maintenance” in this document).

The chemical filter should be periodically checked for proper back-flow operation and possible clogging due to chemical viscosity.
System Components — Reservoir (Float Tank)

The Reservoir stores the water and regulates the water level. Water flows from the main water supply (spigot) to the Reservoir.

- **300-2725** – Cover (2000 System)
- **300-2683** – Cover (600 System)
- **300-0219** – Float Valve (2 for 2000 System – 1 for 600 System)
- **300-2726** – Tank (2000 System)
- **300-2682** – Tank (600 System)
- **300-1538** – Float Level Switch

The proper level of water is maintained by the Float Valve. This is a common valve found in most hardware stores. As the water is pulled from the Reservoir through the pump to the sprayer, the valve opens to allow more water from the main water supply.

The main water supply must provide a minimum flow of 5 gallons per minute at 30PSI. In the event that the water level in the Reservoir falls below the Float Level Switch, the system will shut off automatically (see “System Components - Float Level Switch” in this document).
The Unloader assembly is a safety mechanism that relieves pressure in the lines when the sprayers are not in use. The valve is pre-set at the factory and should be adjusted only by authorized service technicians.

There are two basic Unloader Valves:

- Assemblies with the white spring are designed for the 600 series systems and are normally calibrated for a pressure of 850PSI or 1100PSI.
- Assemblies with the blue spring are designed for the 2000 series systems and are normally calibrated for a pressure of 2000PSI.

Review “System Hydraulics” in this document for a overview of the Unloader Valve operation.
The Line Pressure Relief Valve is designed to relieve the water pressure at the remotes then the system is turned off.

When the system is turned off at a remote, the valve opens for 3 seconds and empties a small amount of water back into the Reservoir.

With pressure still in the lines, hose, and sprayer, it is extremely difficult to disconnect the hose and/or sprayers at the remote. Relieving the pressure allows for easy removal of the hose from the remote station or sprayer from the hose.
The Flow Switch is activated when a remote is turned on and a sprayer is triggered. The flow of water through the switch activates an electrical circuit in the Master Control Panel allowing the chemical pump/solenoid to operate once the chemical button is pressed at the remote.

As stated, when a chemical is selected at a remote station, the Flow Switch circuit together with the chemical circuit activates the chemical solenoid or pump. This action, in turn, draws chemical from their container and mixes it with the water at the low pressure end of the pump. The water and chemical mixture is then passed through the pump to the sprayers.

The Flow Switch replaces the “Chemical Inhibit Switch” of the older model SMT units. The micro switch (not shown) was mounted on the Unloader Assembly and activated by the in and out movement of the Unloader plunger.
When a chemical button is selected at a remote station, an electrical circuit is activated in the Master Control Panel. The chemical circuit, along with the Flow Switch circuit (see “System Components - Flow Switch” in this document) activates the chemical solenoid or pump.

This, in turn, draws chemical from their containers and mixes it with the water at the low pressure side of the pump. The water and chemical mixture is then passed through the pump to the sprayers.

300-3273 – Chemical Solenoid
300-3280 – with fittings, tubing, and chemical filter (foot-screen)
The Thermal Limit Switch monitors the temperature of the water in the system. If the temperature reaches 140°, the system will shut down until the water cools.

SMT is a pressure washing system and intended to run off of a cold-water tap. However, if running from a hot-water heater, the maximum temperature at the spigot should be from 115° to 120°F.

300-2947 – Thermal Limit Switch
System Components — Float Level Switch

The Float Level Switch is mounted near the bottom of the Reservoir and monitors the water lever in the Reservoir. If the water level falls below the switch, the circuit will be “opened” and the system will shut down until the water level rises above the switch.

The purpose for the switch is to guard against running the pump dry. The switch is activated before the Reservoir runs out of water. Assuming the main water volume is adequate, the cause for running out of water in the Reservoir may be a spigot being partially or completely closed, clogged filter, clogged water supply, or bent or restricted water supply hose.

300-1538 — Float Level Switch
System Components – Chemical Pumps

Chemical pumps are used with some systems that require either a finite chemical mix or larger volumes of chemical that cannot be supported by the standard chemical solenoids.

300-0420 – Diaphragm Pump

Speed Adjustment
(on the rear of the pump)

Volume Adjustment

Air Bleeder Valve

Air Bleeder Tube

300-0435 - Back-flow Valve - 300-2917

300-2901 – Brass Chemical Filter

300-4095 – Peristaltic Pump

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System Components — Bleeder Valve

300-1967 – Bleeder Valve Assembly

The Bleeder Valve is used to relieve the hydraulic pressure in the lines while servicing the system.
System Components — **Accessories** *(sprayers/hoses/hardware)*

Quick-Connects – Shut-off

- **000-0041** – Mounted on the hose or sprayer
- **300-1390** – Mounted on the remote or hose

Quick-Connects – Flow-thru

- **000-0242** – Mounted on the sprayer
- **000-0241** – Mounted on the hose

There are a large number of sprayers available with a variation in lengths, nozzle types, and nozzle sizes. Click [HERE](#) to see nozzle sizes on the next page.

There are a number of styles and lengths of hoses. Hoses and hose reels are matched to a specific customer need.

When ordering a sprayer or nozzle, the nozzle sizes have to be matched to the motor/pump configuration of the system.
When ordering a sprayer or nozzle, the nozzle sizes have to be matched to the motor/pump configuration of the system.

**System Components – Accessories (Nozzles)**

- **600 System – 2.2 GPM @ 1050 PSI**
  - 300-3410 - #2530 (low pressure)
  - 300-3360 - #2504 (high pressure)
  - 300-3440 - 1.3 Vari-nozzle

- **2000 System – 3.2 GPM @ 1850 PSI**
  - 300-3410 - #2530 (low pressure)
  - 300-3375 - #2507 (high pressure)
  - 300-3427 - 1.7 Vari-nozzle

- **600 System – 2.9 GPM @ 850 PSI**
  - 300-3410 - #2530 (low pressure)
  - 300-3375 - #2507 (high pressure)
  - 300-3427 - 1.7 Vari-nozzle

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System Components — Tubing and Wire

Stainless steel tubing and wire are normally installed by the factory or certified 3rd-party installers. No maintenance is required.

In the unlikely event that a leak is detected, service should be provided by factory or certified service personnel.

System tubing is 3/8”, stainless steel. The tubing carries water to each remote station.

Couplings are stainless steel compression type.

Wire is 6 conductor, shielded with plenum cover. The wire carries low voltage (24volt DC) current from the Master Control Panel to each remote station.
There are various styles and models of remote stations. The style depends on the application, tubing topography, and mounting surface.
Periodic Maintenance

There are three areas that require periodic maintenance…water, chemical, and lubricant.

**Water**  – The most common problems with water are the mineral and impediment contents. Certain areas of the country have high concentrations of minerals. Also, some facilities use “recaptured” water which may have high levels of impediments. To combat these problems, SMT provides two water filters on each system:

- The main water supply filter is between the main water supply spigot and the Reservoir. This filter is rated at 5 micron and will eliminate a majority of impediments. It should be changed every 3 months or sooner if it starts to discolor.

- The mesh screen bulb filter inside the Reservoir should be changed or soaked in Lime-Away (or CLR) every 3 months. If calcium buildup occurs on the bulb filter, it is also likely that it is building up elsewhere in the system. It is recommended that an ounce of Lime-Away be poured into the Reservoir periodically. The system should be run for about 10 minutes without pressing the sprayer trigger, then 5 minutes more while pressing and holding the sprayer trigger. Depending on the main water supply condition, this process should be done every three months.

**Chemical**  – Each chemical draw tube has a brass foot screen filter with a check-valve. This filter should be checked every 3 months and cleaned or replaced. Always insure that the check-valve ball moves freely in the neck of the filter body.

**Lubricant**  – The lubricating in the pump should be drained and replaced every 3 months. When replacing the oil, fill to the middle of the red dot of the oil-level cap located at the front of the pump. Review “System Operation” at the beginning of this document for more information.
Wiring Schematic