

APPLICATION

The Hamo T-21/T-21L Washer/Disinfector is intended for use in the cleaning, drying, and low-level disinfection of soiled reusable utensils, trays, glassware, bedpans and urinals, rubber and plastic goods, simple hard-surfaced rigid surgical instruments (such as forceps and clamps), and other similar items found in healthcare facilities.

DESCRIPTION

The T-21/T-21L unit is a mechanical washer/disinfector equipped with an Infra-Control control system. The Infra-Control is designed to store up to 99 Washing Cycle Programs, each containing up to 50 different cycles.

The T-21/T-21L Washer/Disinfector is built to seismic design and includes a vented system. This unit offers both manifolded (internal) and non-manifolded (external) washing and is standard with an automatic power door (in a single- or double-door configuration).

Size (W x H x L)

Exterior Dimensions:

- **T-21:** 1200 x 1800 x 900 mm
(47.3 x 70.9 x 35.5")
- **T-21L:** 1200 x 1800 x 1060 mm
(47.3 x 70.9 x 41.7")

Load Dimensions:

- 640 x 600 x 640 mm
(25.2 x 23.6 x 25.2")
- 640 x 600 x 856 mm
(25.2 x 23.6 x 33.7")

Load Height:

- 900 mm (35.4") above finished floor.



(Typical only – some details may vary.)

The Selections Checked Below Apply To This Equipment

POWER

- Steam
- Electric

POWER DOOR CONFIGURATION

- Single
- Double:
 - Automatic Transport

VOLTAGE*

Steam:

- 208 V, 60 Hz, 3-Phase
- 230 V, 50/60 Hz, 3-Phase
- 400 V, 50 Hz, 3-Phase
- 480 V, 60 Hz, 3-Phase

Electric:

- 200 V, 50/60 Hz, 3-Phase
- 220 V, 50/60 Hz, 3-Phase
- 400 V, 50 Hz, 3-Phase
- 480 V, 60 Hz, 3-Phase

* Careful consideration should be given to voltage selection prior to ordering. Later changes require substantial field modification.

ACCESSORIES

- Seismic Tie-Down Kit

OPTIONS

- 12" Base For Single Door Unit
- Ultrasonic Package
- Drain Discharge Cool Down
- Numerical Protocol Printer
- Additional Peristaltic Pump (Fourth Dosing Pump)
- Language Package
 - French
 - German
 - Spanish

Item _____

Location(s) _____

STANDARDS

The washer/disinfector meets applicable requirements of the following standards:

Governing Directive for the affixing of the CE mark:

- Medical Device Directive 93/42/EEC
- Independently Type Tested to confirm compliance with prEN ISO 15883 Washer/Disinfectors, Part 1: General Requirements, Definitions and Tests.

STANDARD FEATURES

Automatic power sliding door(s) is constructed of glass and/or 316L stainless steel.

Stainless-steel pump provides 946 L/ min (250 U.S. gal/min) circulation using a 2.7 kW (3.6 HP) motor. Pump motor is equipped with drip-proof frame, magnetic starter, overload protection, and sealed bearings (requiring no periodic lubrication).

Pump, spray system, and all recirculating piping are of **stainless steel construction**.

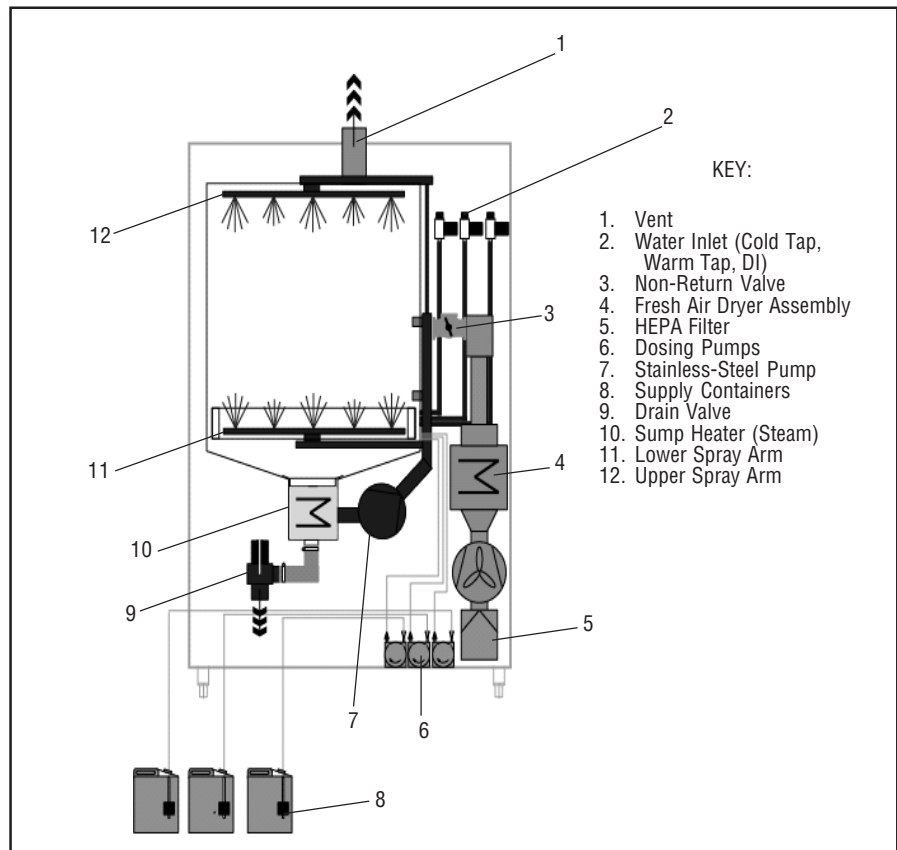
To prevent bacterial contamination from one Rinse cycle to another, the pump is completely drained at each water change.

Rotary spray assemblies are positioned (one at top and one at bottom of chamber) to reach all surfaces of load. Depending on rack in chamber, additional spray assemblies are available.

Heating coil in the bottom of wash chamber (sump, steam) or optional boiler (electric) raises and maintains water temperature up to 60°C (140°F) during Wash cycle and up to 93°C (199°F) during Thermal Rinse cycle.

Removable stainless-steel filters in chamber sump prevent debris from entering pump.

Wash chamber is constructed of 16 gauge, 316L stainless steel, argon-welded. Chamber inhibits corrosive action of detergent, and is easy to clean, with no enameled surfaces to chip or crack.



Double-walled, insulated construction of chamber exterior reduces heat loss and noise level to the work area.

Detergent injection pump automatically adds a programmed (at 1.48 mL/sec [0.05 oz/sec]) quantity of detergent to sump during Wash cycle. Detergent is pumped directly from the container. An optional low-level sensor is available to indicate when the detergent level in the container is low.

Separate injection pumps handle the acid for the Neutralizing cycle and DI water for the Rinse cycle.

High-capacity air heater (integrated dryer) delivers heated (110°C [230°F]) fresh or recirculated air to the rotary and contact nozzles to ensure drying. Fresh air is drawn through a HEPA filter.

Vented system includes a built-in fan. Chamber vapors are exhausted to the building exhaust system through a 89 mm (3.5") OD vent connection located on top of the chamber.

Infra-Control microprocessor controller, mounted at eye level to the

right of the chamber, allows easy monitoring of all program cycles.

Control system includes five pre-programmed and validated cycles. Control can retain up to 99 processing programs (each with up to 50 cycles) in memory, programmed and named according to customer preferences. Once a program is started, programmed cycle values are locked in and cannot be changed until program is complete.

Control system is equipped with a Service Mode for preventive maintenance testing and to facilitate troubleshooting. A built-in service diagnostic program is included to permit system calibration and verification of component operations. Control also includes a security lock-out feature enabling programs and temperatures to be locked and unchangeable without the proper access code.

Piping, valves, electrical components, and wiring are easily accessible through **service access panels**, located on the top and bottom of the cabinet.

CYCLE DESCRIPTION

ADVISORY NOTE: STERIS does not intend, recommend, or represent in any way that this Hamo T-21/T-21L Single-Chamber Washer/Disinfector be used for the terminal disinfection or sterilization of any regulated medical device. Hamo Washer/Disinfectors are only intended to perform an initial step in the reprocessing of soiled, reusable medical devices. If medical devices will be contacting blood or compromised tissues, such devices must be terminally reprocessed in accordance with current good hospital practices before each use in human patients.

On initial daily start-up, setting the Power Switch to ON prepares the washer/disinfector for cycle operation.

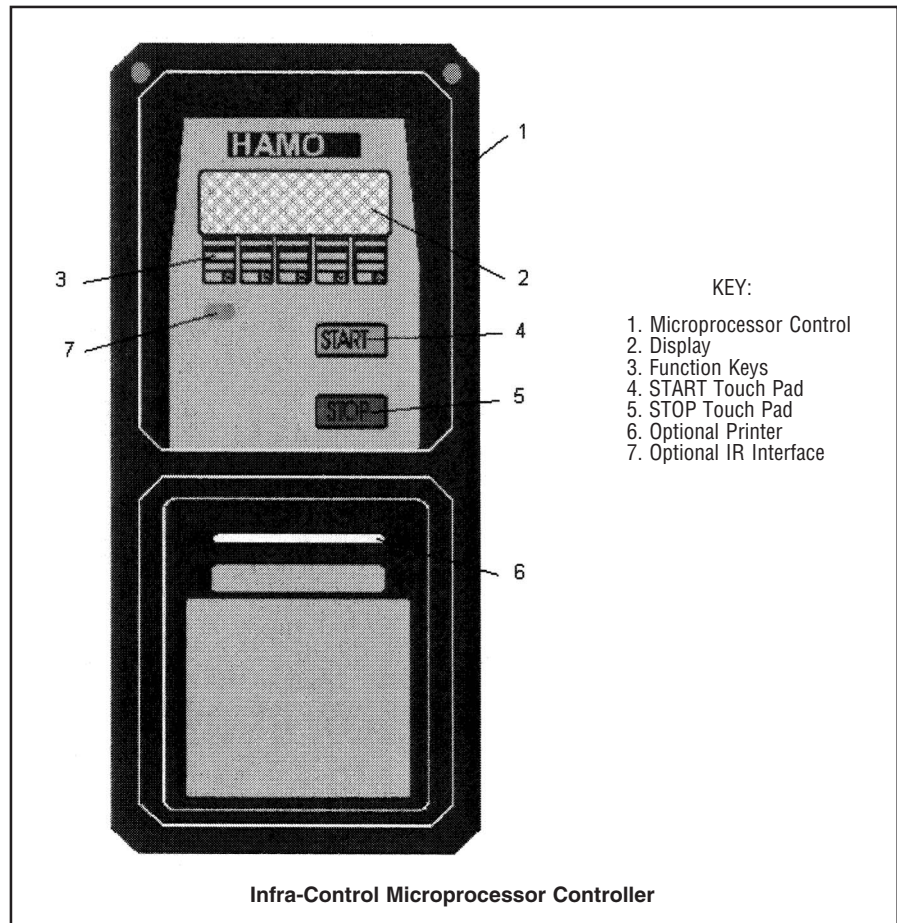
Once a program is selected and START is pressed on Infra-Control, the washer/disinfector automatically processes the load through the following standard phases of each cycle:

- **ANTE** (shown as **A** on controller) -
The first part of the phase (opening the drain valve for example). Programmable elements are drain valve and reserves (if defined).
- **MAIN** (shown as **M** on controller) -
This is the part of the cycle where the cleaning procedure is executed. Programmable elements are temperature settings, peristaltic pump settings, water valves, stainless-steel pump, drain valve, GMP rinser, and reserves (if defined).
- **PAST** (shown as **P** on controller) -
The last part of the phase (opening the drain valve for example). Programmable elements are drain valve and reserves (if defined).

Every cycle progresses *in order* from Ante to Main to Past.

The program can consist of the following (additional cycles are included in certain treatment programs, depending on unit configuration) cycles:

- **Pre-Wash** – Cold water enters the sump from the building supply. Once the sump fills, pre-wash water is recirculated and sprayed over the load for the selected time interval. On completion of the cycle, water is sent to the drain.



- **Wash** – Hot tap water enters the sump from the building supply, where a selected amount of detergent (pH of approximately 12) is added automatically. Detergent solution is heated and maintained at temperature. Once set temperature is reached, solution is recirculated and sprayed over the load for the selected time interval. On completion of the cycle, solution is sent to the drain.
- **Neutralize** – Hot tap water enters the sump from the building supply, where a selected amount of neutralizer (pH of approximately 4) is added automatically. Rinse water may be heated and maintained at a set temperature. Once sump fills, rinse water is recirculated and sprayed over the load for the selected time interval. On completion of the phase, water is sent to the drain.
- **Rinse** – DI water enters the sump from the building supply. Rinse water may be heated and maintained at a set temperature. Once sump fills, rinse water is recirculated and

sprayed over the load for the selected time interval. On completion of the phase, water is sent to the drain.

- **Thermal Rinse** – Hot tap water enters the sump from the building supply. Rinse water is heated and maintained at a temperature of 93°C (199°F).

Once set temperature is reached, rinse water is recirculated and sprayed over the load for the selected time interval (1 to 10 minutes). On completion of the phase, water is sent to the drain.

- **Drying** – Heated HEPA filtered air is circulated through the chamber drying the load.

CONTROL SYSTEM

Design Features

Microcomputer monitors and controls washer/disinfector operations and functions. Program progresses automatically through the designated cycles and phases, as programmed.

Controls are housed in a vertical column, mounted to the right of the chamber. If double door option applies, controls are mounted in a vertical column to the right of the chamber on the load-side. Features include:

1. **Control panel**, consisting of a display window and a row of membrane-type touch pads (labeled A,B,C, D, and E), is included on load-side. Program initiation and cycle value programming are performed at this control panel.

- **Display window** is a Liquid Crystal Display (LCD). Display shows program status, time, temperature, warnings, and instructional messages. Display also indicates any abnormal conditions that may exist when a program is in progress. All messages are complete read-outs with no codes to be cross-referenced.
- **Touch pads** allow operator to view available program menus,

select a cycle, review a cycle before processing, and start or stop programs. Touch pads allow operator to double the program time while reviewing the program and acknowledge alarm conditions. Touch pads allow the operator to bypass program cycles and/or modify factory-set program values to meet specific operating needs. Available programs, along with cycle and phase times and temperatures for each program, can be modified.

2. **Operator/supervisor touch pad-selectable features** are accessible through the control panel.

- **Time display** – permits selection of either Standard AM/PM or 24 hour military (MIL).
- **Security access code** – requires entry of a three- or five-digit access code to change programs and cycle values. Pressing the appropriate touch pad causes display to request entry of an access code. If access code is

not properly entered, display advances to the first program (and related cycle values) not requiring an access code.

- **Date and time** – permits change of date and time.

Technical Data

Control system consists of a microcomputer and a Peripheral Unit (PU).

An **internal battery** backs up all program memory for up to 10 years. If a power failure occurs during a program, the control battery backup system ensures program memory is retained.

Resistive Temperature Devices (RTD) sense temperature inside the chamber. These signals, converted into electrical impulses, provide accurate control inputs and readouts throughout the entire program. Individual temperature calibrations can be made by a trained service technician.

Pressure switches are used to monitor water level of the chamber sump. If pressure switch and/or temperature sensor failure occurs, the alarm sounds and a message is printed.

SAFETY FEATURES

The T-21/T-21L Washer/Disinfector is equipped with a **safety lockout feature** so a program cannot start unless door(s) is fully closed. If door is opened during a program, all utility services to chamber are shut off and program stops.

A **main power ON/OFF switch**, located on the electrical supply box, must be used to shut off power to the unit before servicing.

INSTALLATION

The T-21/T-21L Washer/Disinfector is designed as a fully enclosed cabinet for freestanding or recessed installation.

If unit is recessed through one or two barrier walls, stainless-steel barrier flanges are included to provide a finished wall appearance.

Typical Start-Up Screen

KEY:

1. Program Number
2. Program Name
3. Program Lock Indicator
(If Program Has Been Locked)
4. Date And Time
5. Program Limits
6. Program Variants
7. Machine Type
8. Help Function
9. UP Arrow
(Scroll To Previous Screen)
10. DOWN Arrow
(Scroll To Next Screen)
11. Open Position
12. Next Menu
13. Change Program Temperatures
14. Activate/Deactivate Variants
15. Open Position
16. Open Position
17. Open Position
18. Service Mode Access

Display Window

OPTIONAL FEATURES

Additional peristaltic pumps (three included) automatically add a programmed (minutes and seconds) quantity of liquid to the sump. Liquid is pumped directly from the container. Optional low-level sensors are available to indicate when the liquid level in the containers is low.

Language package is supplied in English as the standard version. Control memory (display messages and printouts) and operator interphase (control touch pads) are available in German, French, or Spanish, upon request.

Automated Conveyors are available to integrate with this equipment in single- or multi-unit installations.

ACCESSORIES

Seismic Tie-Down Kit – unit is designed to comply with Seismic Zone 3 and 4 requirements, and includes a seismic report for proper installing and securing of the washer/disinfector to the building floor.

Multi-voltage transformer is available in the following configurations:

- 220 V, 3-Phase, 3-Wire, 50 Hz, steam or electric
- 400 V, 3-Phase, 3-Wire, 50/60 Hz, steam or electric
- 208 V, 3-Phase, 4-Wire, 60 Hz, electric

Use this transformer in combination with 480 V, 3-Phase, 3-Wire, 60 Hz, steam or electric unit.

PREVENTIVE MAINTENANCE

A global network of skilled service specialists can provide periodic inspections and adjustments to help ensure low-cost peak performance. STERIS representatives can provide information regarding the optional annual maintenance agreements.

NOTES

1. Customer must ensure washer/disinfector stands on a non-combustible floor. (Floor should be level.)
2. STERIS recommends shutoff valves and vacuum breakers (not provided by STERIS) be installed on service lines, and disconnect switches (with lockout in OFF position; not provided by STERIS) be installed in electric supply lines near the equipment.
3. Pipe sizes shown indicate terminal outlets only. Building service lines, which are not provided by STERIS, must supply the specified pressures and flow rates.
4. For all ventilation ducting (not provided by STERIS) from washer/disinfector, STERIS recommends installation of a dedicated corrosion-proof, watertight duct to the exterior of the building, sloped toward the washer. A 76 mm (3.0") ID flexible duct is recommended. An optional system consisting of an exhaust air damper with an integrated condensate return line to the drain is available.
5. STERIS recommends illumination of the service area (if applicable) along with provision of a convenience outlet for maintenance.
6. Weight:
 - **T-21:** 450 kg (992 lb) single door
 - **T-21L:** 480 kg (1058 lbs) double door

UTILITY REQUIREMENTS

Cold Water (1)*

3/4" NPT, 207-517 kPa (30-75 psig). Cold water must be supplied at 16°C (60°F) minimum. Flow rate: 25 L/min (6.6 U.S. gpm).

Hot Water (2)*

3/4" NPT, 207-517 kPa (30-75 psig). Hot water must be supplied at 43°C (110°F) minimum. Flow rate: 25 L/min (6.6 U.S. gpm).

Pure or DI Water (3)* †

3/4" NPT, 241-517 kPa (35-75 psig). Flow rate: 25 L/min (6.6 U.S. gpm). Recommended minimum specific resistivity of 0.1 megohm per cm.

Drain (4)*

1-1/2" NPT. A 51 mm (2.0") OD floor drain are recommended.

Electricity (5)*

208 V, 60 Hz, 50 Amp;
220 V, 50 Hz, 60 Amp;
400 V, 50/60 Hz, 25 Amp; or
480 V, 60 Hz, 6.3 Amp.

Steam (6)* †

1/2" NPT, 262-517 kPa (38-75 psig). Peak flow rate: 1 kg/min (132 lbs/hr).

Condensate Return (7)* †

1/2" NPT. 262-517 kPa (38-75 psig).

Ventilation (8)†

89 mm (3.5") OD vent connection. Maximum flow rate: 150 Pa (0.02 psi). Maximum temperature: 80-100°C (175-210°F).

Air (A)†

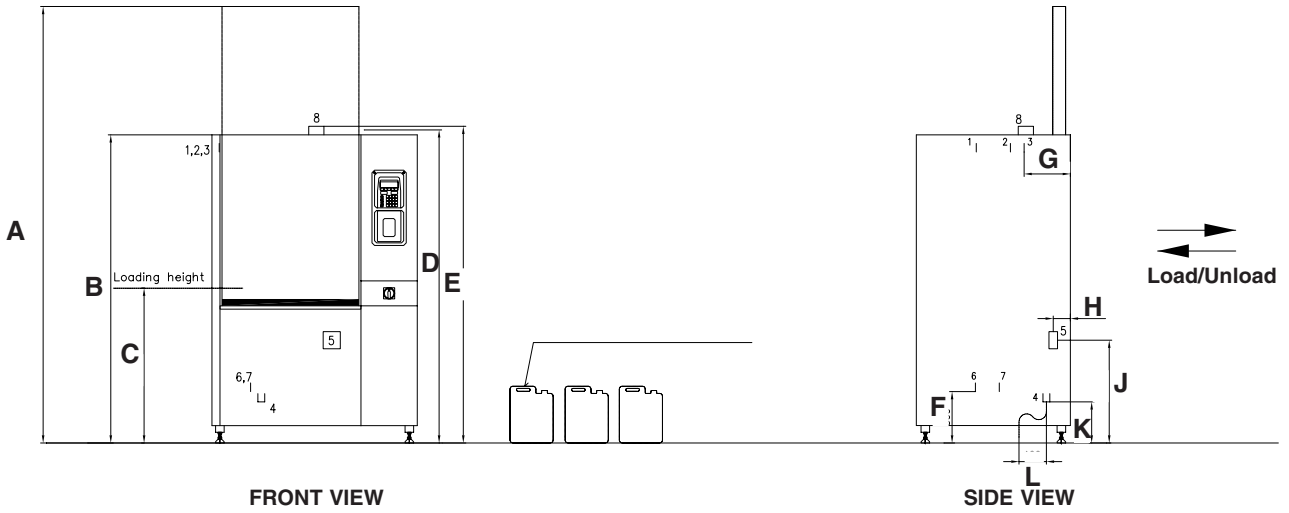
1/4" NPT, 2.5 to 5.0 bar (38-75 psig) sterile air.

* Refer to equipment drawing for location of utility.

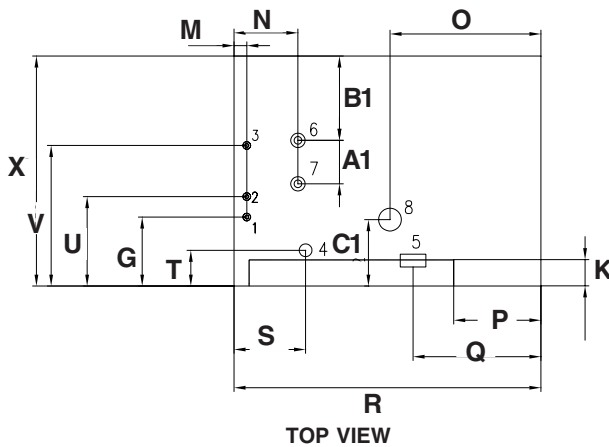
† If option applies.

CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH APPLICABLE LOCAL AND NATIONAL CODES AND REGULATIONS.

**Dimensions shown here are typical, and subject to change without notice.
REFER TO STERIS EQUIPMENT DRAWINGS FOR
COMPLETE AND DETAILED INSTALLATION SPECIFICATIONS.**



Steam

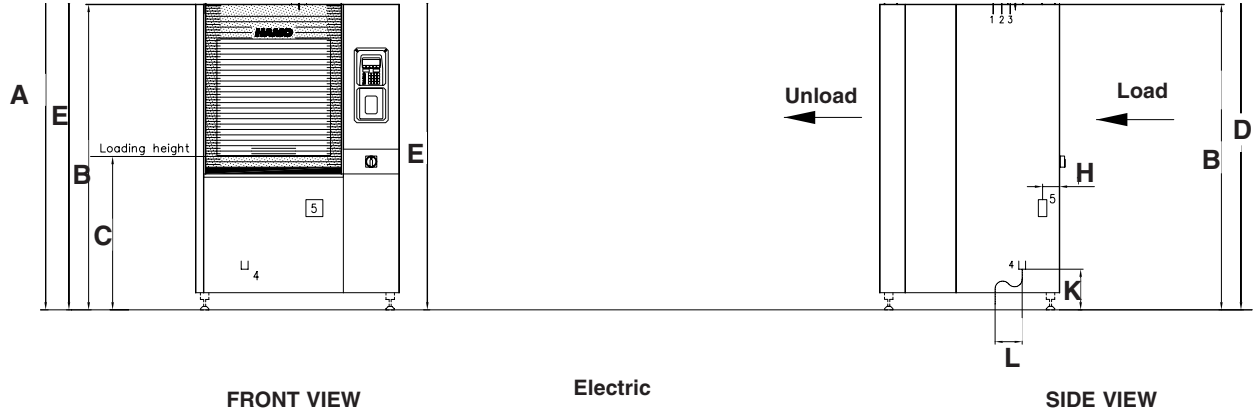


Dimensions

Letter	Inches	MM
A	100.4	2550
B	70.9	1800
C	35.6	904
D	72.4	1840
E	72.8	1850
F	11.8	300
G	10.6	270
H	3.9	100
J	23.6	600
K	9.4	240
L	6.3	160
M	2.0	50
N	9.8	250
O	23.2	590
P	13.4	340
Q	19.7	500
R	47.2	1200
S	11.0	280
T	5.5	140
U	13.8	350
V	21.6	550
X	35.4	900
A1	6.7	170
B1	13.0	330
C1	10.2	260

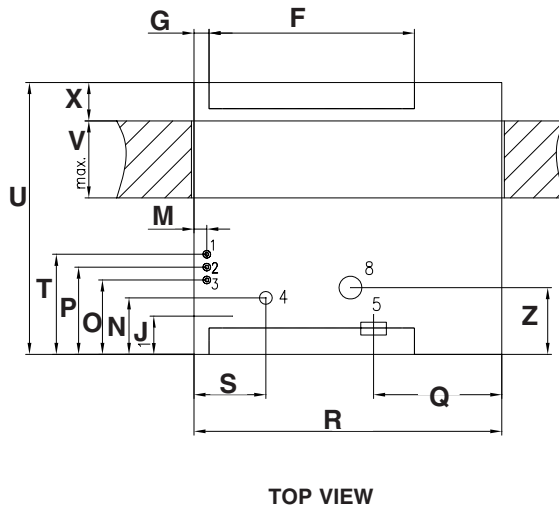
Hamo T-21 Washer/Disinfector, Single Door

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REFER TO STERIS EQUIPMENT DRAWINGS FOR
COMPLETE AND DETAILED INSTALLATION SPECIFICATIONS.**



Dimensions

Letter	Inches	MM
A	100.4	2550
B	70.9	1800
C	35.6	904
D	80.3	2040
E	72.8	1850
F	31.5	800
G	2.4	60
H	3.9	100
J	5.9	150
K	9.4	240
L	6.3	160
M	2.0	50
N	8.7	220
O	11.4	290
P	13.4	340
Q	19.7	500
R	47.2	1200
S	11.0	280
T	15.4	390
U	41.7	1060
V	11.8	300
X	5.9	150
Z	10.2	260



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