



INTRODUCTION

Thank you for purchasing your Electrovert Omni Series Forced Convection Reflow Oven.

This document contains information to answer all the frequently asked questions in relation to the installation of your Omni Series Reflow Oven.

Section 1 – Important Installation Requirements

Section 2 – Leveling the Machine

Section 3 – Facility Requirements, Connections, and Capacities

Section 4 – Training

Section 5 – Machine Footprint/Spec Drawings

If you have any further questions, please don't hesitate to contact the Electrovert Tech Support Group @ 800-737-8110 Option 3 or evtsupport@itweae.com.

Thank you for your cooperation, may I take the opportunity of wishing you many years of quality production with your new Omni Series Reflow Oven.

Sincerely,

Pat O'Brien
Vice President/General Manager

OmniMax™/OmniES™

Forced Convection Reflow Oven

PRE-INSTALLATION INSTRUCTION



Customer Service and Support

ELECTROVERT
1629 Old South 5 Camdenton,
MO 65020 U.S.A.
800-737-8110 Option 3
evtsupport@itweae.com

INSTALLATION PREPARATION

RECEIVING INSTRUCTIONS

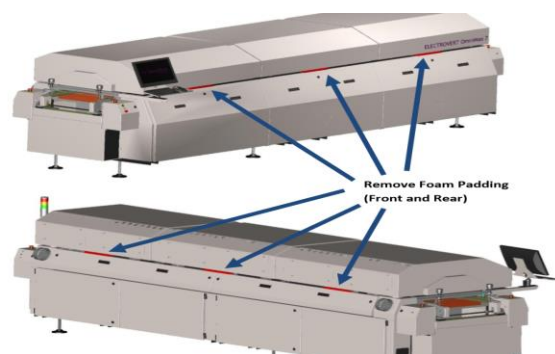
Maintain a safety perimeter of at least 914 mm (36 in.) around the machine for efficient operation and maintenance.

Upon receipt, thoroughly inspect the system. If any damage or loss is detected, enter all details on the freight bill or receipt, and then have it signed by the carrier agent. Failure to follow this procedure may result in the carrier's refusal to honor the claim. The carrier is responsible to furnish the necessary forms for filing a claim.

When damage is not readily apparent until the equipment has been unpacked, file a claim for concealed damage. Make a written or telephone request to the carrier for inspection as soon as the damage is discovered. This type of claim must be completed within 48 hours of delivery. Keep all cartons, packing materials and paperwork. The carrier will furnish an inspection report and the necessary forms for filing the concealed damage claim.

PACKING REMOVAL

The system arrives carefully padded and secured. Remove the packaging materials as outlined below. The following figure shows a typically packaged reflow oven.



Remove Foam Padding (Front and Rear)

1. Remove the plastic wrapping from the perimeter of the system.
2. Remove the foam padding and cardboard between external panels/hoods.

- 3.** Remove the strapping securing all cardboard containers and any other components secured to the system skid.
- 4.** Carefully place all separate components and document package in a safe place close to the site of installation for later use.
- 5.** Remove packing materials from around keyboard/monitor assembly.
- 6.** Remove packing materials around light tower.
- 7.** Visually inspect machine for concealed damage. Check for damage to instruments, controls and enclosures.
- 8.** Inspect the shock meter located on the upper part of the unload end of the machine.

SKID REMOVAL (if equipped)



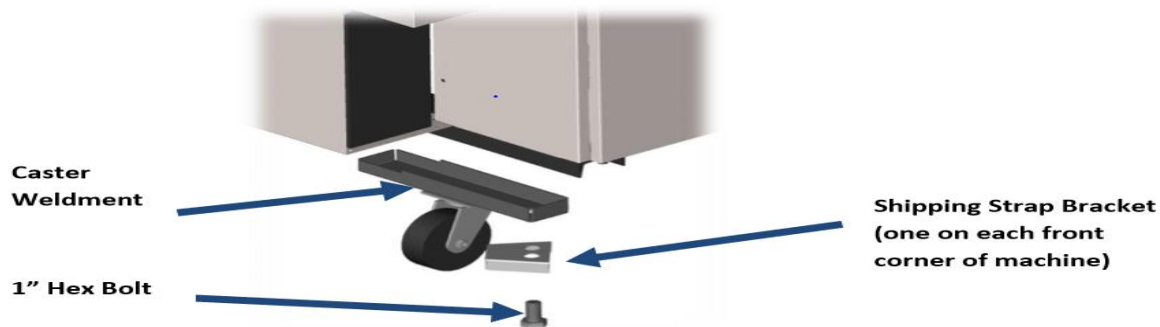
If equipped, the machine is mounted on wooden planks and bolted to a wooden skid, or pallet. Bolts are installed in the existing leveling foot locations to secure the metal shipping plates to the underside of the system frame. Bolts are then inserted through the mounting holes in the skid, through the foam pads, through the planks, and finally through the mounting holes on the shipping plates. They are retained with jam nuts to secure the system in place on the skid.

Refer to the following procedure to remove the machine from the skid.

- 1.** Use a $\frac{3}{4}$ in. socket wrench and ratchet to remove the two (2) jam nuts from each of the bolts from the top side of the wooden planks.
- 2.** When all jam nuts are removed from the shipping plates, carefully position a fork lift, with the fork extensions at their widest setting, under the frame. Make sure that the forks make proper contact with the base beams to avoid damage to the wiring and metal panels underneath the machine.
- 3.** With the fork lift in place at the rear of the machine, carefully raise the system off the skid high enough to remove the shipping plates and bolts from the system frame. Note that the center of gravity of the machine is slightly toward the load end of the system.

4. Use a 1 ½ in. socket with ratchet to remove the shipping bolts from the machine frame.
5. Install the leveling legs by screwing them into the frame where the shipping bolts were removed. The legs should extend approximately 125 mm (5 in.) from the base of the system frame. Ensure the consistency of this distance with each leg.
6. Carefully position the system into place for installation.
7. Slowly lower the system onto the leveling legs at the site of installation and remove the forklift.

CASTER REMOVAL (if equipped)



If equipped, the machine is mounted on six (6) caster weldments. Bolts are installed in the existing leveling foot locations to secure the casters to the underside of the system frame.

Refer to the following procedure to remove the casters from the machine.

1. Position pallet jacks at each end of the machine or carefully position a forklift, with the fork extensions at their widest setting, under the frame. Make sure that the forks make proper contact with the base beams to avoid damage to the wiring and metal panels underneath the machine.
2. Carefully raise the system high enough to remove the casters and bolts from the system frame. Note that the center of gravity of the machine is slightly toward the load end of the system.



3. Use a 1 ½ in. socket with ratchet to remove the six (6) bolts from the machine frame. Caster Weldment 1" Hex Bolt Shipping Strap Bracket (one on each front corner of machine)
4. Install the leveling legs by screwing them into the frame where the bolts were removed. The legs should extend approximately 125 mm (5 in.) from the base of the system frame. Ensure the consistency of this distance with each leg.
5. Carefully position the system into place for installation.
6. Slowly lower the system onto the leveling legs at the site of installation.
7. Place the six (6) caster weldments and two (2) shipping strap brackets in the empty shipping box provided with the machine and ship them back to the factory.

SPARE PARTS BOXES (if applicable)

Please don't open the spare parts boxes without the presence of our Field Service Eng. If some parts are missing our FSE will reported. If the boxes are opened we won't be responsible to replace the part.

INSTALLATION

The rear electrical box access doors are hinged and can be swing open once unlatched. Note that the electrical cabinet door containing the main power disconnect can only be opened if the disconnect is in the "OFF" position. Also, note that the machine external hood is opened via an electromechanical actuator and cannot be opened until power is supplied to the machine.

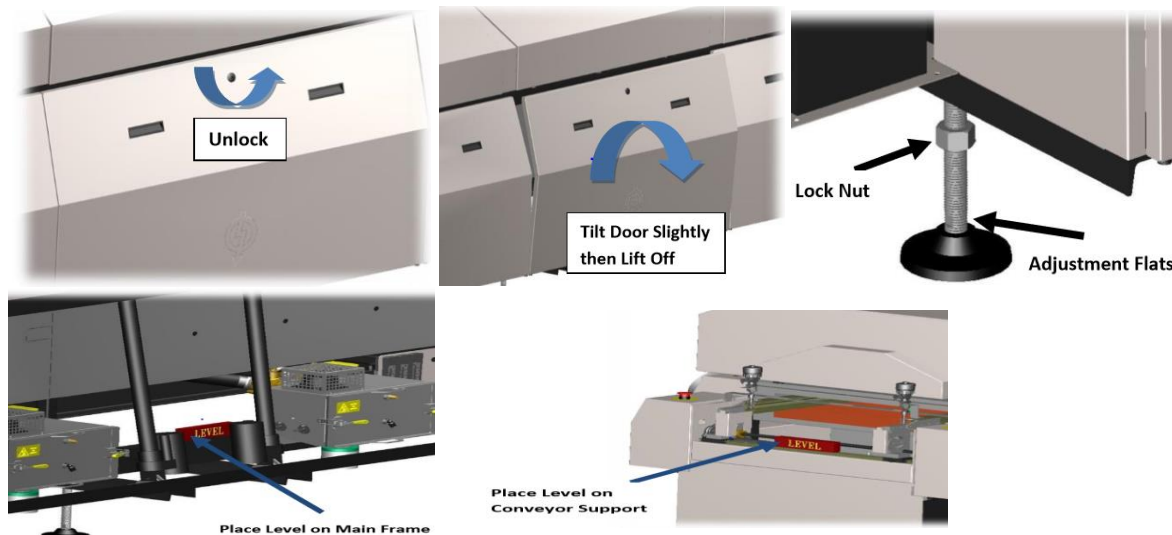
LEVELING THE MACHINE

The machine is configured with leveling legs used for height adjustment and leveling. The leveling must be performed in both the front-to-rear direction and the load-to-unload direction. Use the following procedure to correctly level the machine.

1. Place machine to be aligned with upstream and downstream equipment with a 10mm gap between adjoining conveyors that should already levelled.
2. Open the front access doors from the machine. Use a crescent wrench and adjust the center leveling legs so they do not touch the floor. The machine will be supported by only the four (4) leveling legs located at each corner of the machine. Alternately adjust the corner leveling legs until

the conveyor reaches the required height. Place a spirit (bubble) level approximately in the center of the front load-to-unload main frame beam, adjust the front load and unload leveling legs until the level indicates proper positioning. Place a spirit level across the end conveyor support on the load end.

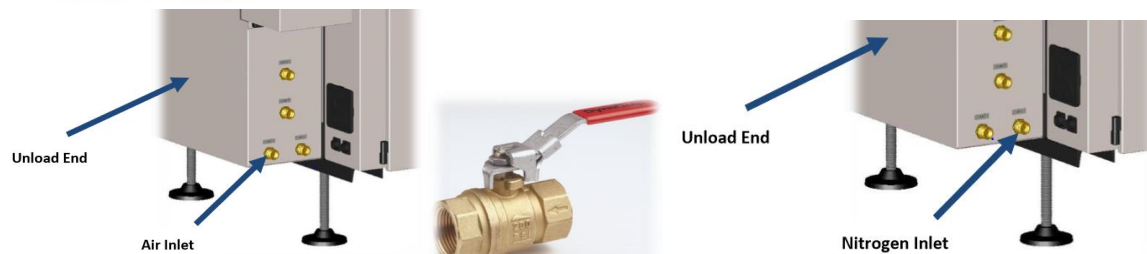
3. (Place Level on Main Frame) (Place Level on Conveyor Support) Verify the load-to-unload position is still level. Adjust the center leveling legs until they just make contact with the floor. Turn them an additional ½ turn to support the weight of the center of the machine.



FACILITY CONNECTIONS

1. **AIR CONNECTION** (if equipped) The machine requires a clean, dry compressed air (CDA) supply if any of the following options are installed on the machine: Nitrogen Inert Heating/Cooling, Intelligent Flux Control™ (IFC), Automatic Chain Oiler Dual Trak™ Conveyor.

The connection is made via a 1/2 in. NPT fitting. Please refer to the Engineering Data Sheet for supply line requirements at the end of the manual, to provide for lock-out/tag-out safety protection of the pneumatic system, a lockable safety valve rated for a minimum of 1380 kPa (200 psi) must be installed to properly turn off the gas supply, air pressure and vent residual gas.



AIR AND NITROGEN CONNECTION (if equipped)

The machine requires a filtered (5 micron), contamination-free nitrogen supply if any of the following options are installed on the machine.

Nitrogen Inert Heating/Cooling

The connection is made via a 1/2 in. NPT fitting. Please refer to the Engineering Data Sheet for supply line requirements at the end of the manual

COOLANT CONNECTIONS (if equipped)

The machine requires a water supply if any of the following options are installed on the machine:
Nitrogen Inert Heating/Cooling.

Unload End: Nitrogen Inlet

Unload End: Air Inlet

The connections are made via 1/2 in. NPT fittings. Please refer to the Engineering Data Sheet for supply line requirements at the end of the manual.

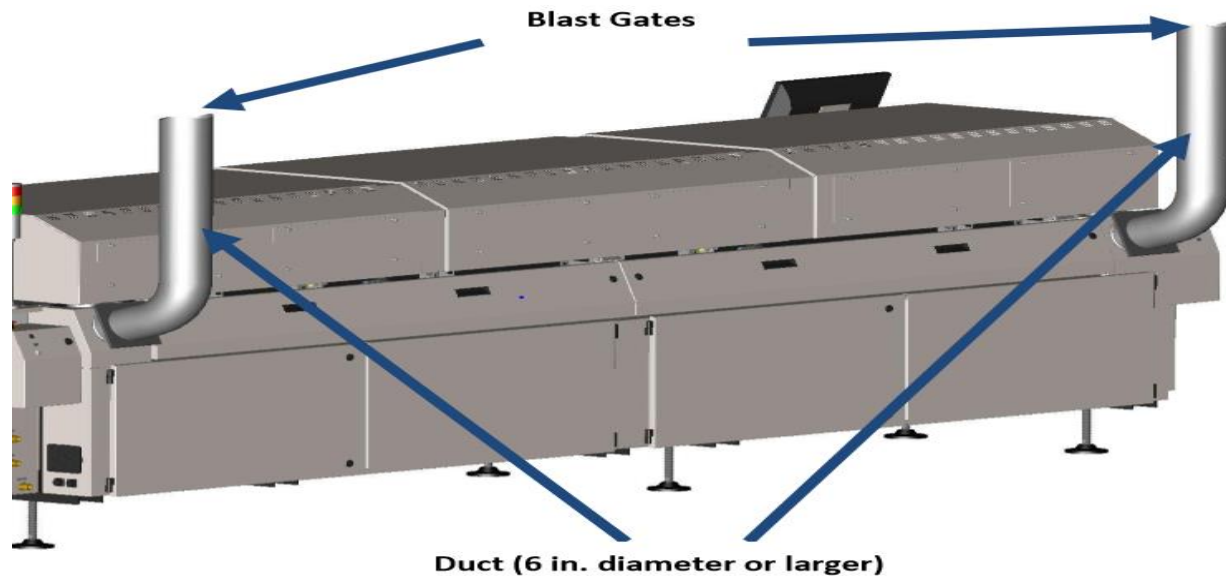
EXHAUST CONNECTIONS

The machine requires properly balanced exhaust for safe and efficient machine operation. The connection is made via 6 in. duct fittings.

Recommended connection includes blast gates installed at each of the machine ports and smooth, straight 6 in. diameter or larger sections of duct that are at least 6 times the duct diameter in length. Exhaust velocity pressure should be measured in the center of the straight section with a Pitot tube and manometer. This can then be converted to exhaust flow and balanced with the blast gates at

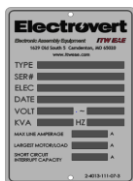
N2 OVEN: 150 cfm both sides

AIR OVEN: 150 CFM LOAD END AND 300 CFM UNLOAD END.

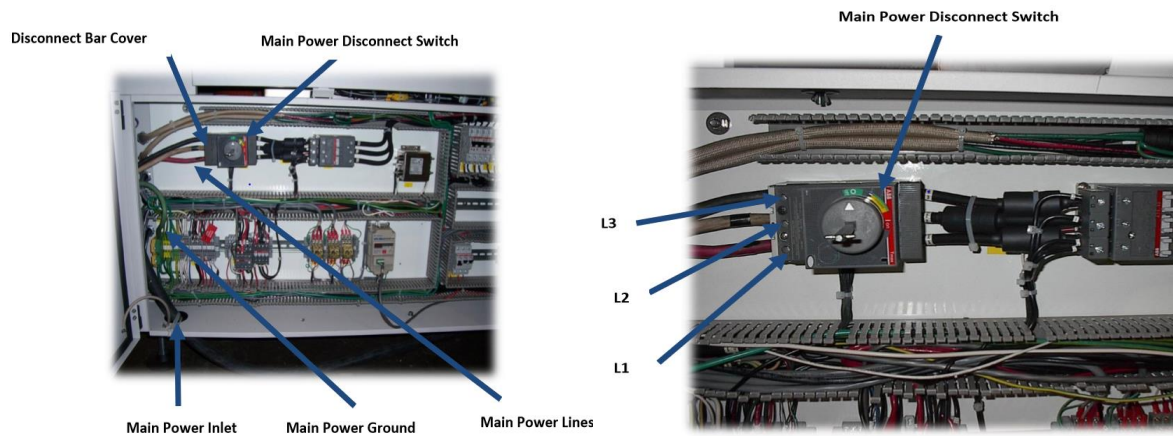


ELECTRICAL CONNECTIONS

The operating voltage for the machine is listed on the machine serial name plate located at the rear, unload end of the machine. Before connecting power to the machine, it is necessary to verify that the facility voltage corresponds to the voltage on the serial name plate using the following procedure.



- 1.** Open the rear, unload end electrical cabinet door that contains the connection to the Main Power Disconnect Switch.
- 2.** Locate the Main Power Disconnect Switch (SW-01) in the electrical cabinet.
- 3.** Remove the cover that houses the Main Power Disconnect bar.
- 4.** Locate the main power inlet underneath the electrical cabinet at the unload end.
- 5.** Route the house supplied power cords through the power inlet.



NOTE: Supply enough length to route the cords against the side wall of the electrical cabinet so as not to obstruct access to the main power ground or nearby terminal blocks. 6. Connect the ground line to the yellow and green ground connector. 7. Connect the power lines to SW-01. Connect the lines so that they enter the hex lug connector from the back of the switch. Replace the cover that houses the Main Power Disconnect bar before proceeding.



TRAINING AT INSTALLATION

As part of the Installation process, ITW EAE offers a complimentary “up and running” training program. This covers the basic operation, maintenance and programming of the oven and associated options.

- Production Boards
- Required floor space needed for the machine
- Availability of upstream and downstream conveyors

Training Summary

Customer Start-Up Assistance Training

- The FSE (field service engineer) will provide maximum of eight hours of training for up to four process engineers*
 - If possible, use several different combinations of boards.
- The FSE will provide a maximum of four hours of training for up to four operators*
- The FSE will provide a maximum of four hours of training for up to four maintenance technicians*
- The FSE will assist to create new recipe for basic usage.

- The FSE will then demonstrate that the system performs to specification using the customer’s board production.

***NOTE:** The customer's personnel are expected to devote the entire time to the training program. Hours not devoted by the customer may not be “banked” for later use.

Additional Training

A full range of training courses are available covering operation, maintenance and process. Courses are conducted at our ITW EAE Camdenton, MO.

For further information, including course descriptions and schedule please contact the Training Department or visit <http://www.itweae.com/services-and-support/americas>

NEED CONSUMABLES?

*For current pricing and availability please contact our Parts Department at usparts@itweae.com.

*For any questions you may also contact us at 800-737-8110.

OmniES™ 5

FORCED CONVECTION REFLOW SYSTEM ENGINEERING DATA SHEET

CAUTION: *Operation of this system at extreme setpoints for extended periods may cause damage to machine components and void the warranty. Chemicals used with this equipment must be compatible with Delrin, polyethylene, silicone, Teflon, aluminum, brass, copper, galvanized steel, and stainless steel. Failure to use compatible fluxes, cleaners, and other chemicals with this system will void the warranty.*

SPECIFICATIONS

Required gas supply ¹	Both nitrogen (N ₂) and clean, dry, compressed gas (CDA) supply lines should be installed
Supply line pressure	552 - 690 kPa (80 - 100 psi)
Minimum available flow rate	57 m ³ /hr (2000 SCFH)
Typical nitrogen consumption to achieve <50ppm in fully loaded condition ^{2,3}	"Optimized" Convection Settings: <25 m ³ /hr (900 SCFH) "Maximum" Convection Settings: <40 m ³ /hr (1400 SCFH)
Typical nitrogen consumption to achieve <1000ppm in fully loaded condition ^{2,3}	"Optimized" Convection Settings: <20 m ³ /hr (700 SCFH) "Maximum" Convection Settings: <31 m ³ /hr (1100 SCFH)
Typical "idle time" nitrogen savings with Closed Loop Nitrogen option	8 – 11 m ³ /hr (300 - 400 SCFH) @ "Maximum" Convection
Typical oxygen purge time ⁴	Ambient to full process ready state: <15 min.

EXHAUST SPECIFICATIONS

STANDARD AIR OPERATION

Load-end ¹	255 m ³ /hr (150 SCFM)(minimum requirement)
Unload-end ¹	510 m ³ /hr (300 SCFM)(minimum requirement)
Water gauge pressure drop ²	Allow for 38 mm (1.5 in.) water gauge pressure drop per port at the machine
Facility duct size	All facility exhaust ducts to be 152 mm (6.0 in.) or larger diameter

INERT ATMOSPHERE OPERATION

Load-end ¹	255 m ³ /hr (150 SCFM)(minimum requirement)
Unload-end ¹	255 m ³ /hr (150 SCFM)(minimum requirement)
Water gauge pressure drop ²	Allow for 13 mm (0.5 in.) water gauge pressure drop per port at the machine
Facility duct size	All facility exhaust ducts to be 152 mm (6.0 in.) or larger diameter

NOTE¹: All specified exhaust requirements listed above are minimum values. To insure proper machine internal flow, please maintain the differences in flow rates between the exhaust ports if higher values are used. The external exhaust connections are the same for both standard air and inert atmosphere machines. The internal connections to the lip vents are configured according to the air or inert atmosphere machine configuration.

NOTE²: Water gauge pressure drop is the head loss internal to the machine that the facility exhaust system must overcome at the minimum required flowrate.

Air and Inert Gas Inlet.

Inlet Size and Pressure	0.5 in. male NPT; 310 – 483 kPa (45 – 70 psi)
Pressure Drop	207 kPa @ 11.4 l/min. (30 psi @ 3 US gal./min.)
Feed Temperature	10° - 30° C (50° - 86° F)

NOTE: A check valve should be installed by the customer on the coolant water return line.

POWER SPECIFICATIONS:

STANDARD

- 440-480 VAC, 3-phase, 60 Hz (4 wires: 3 phase, 1 ground)

OPTION

- 380-415 VAC, 3-phase, 50 Hz (5 wires: 3 phase, 1 neutral, 1 ground)

NOTE: Please consult the factory for special voltage and/or frequency requirements and specifications not listed.

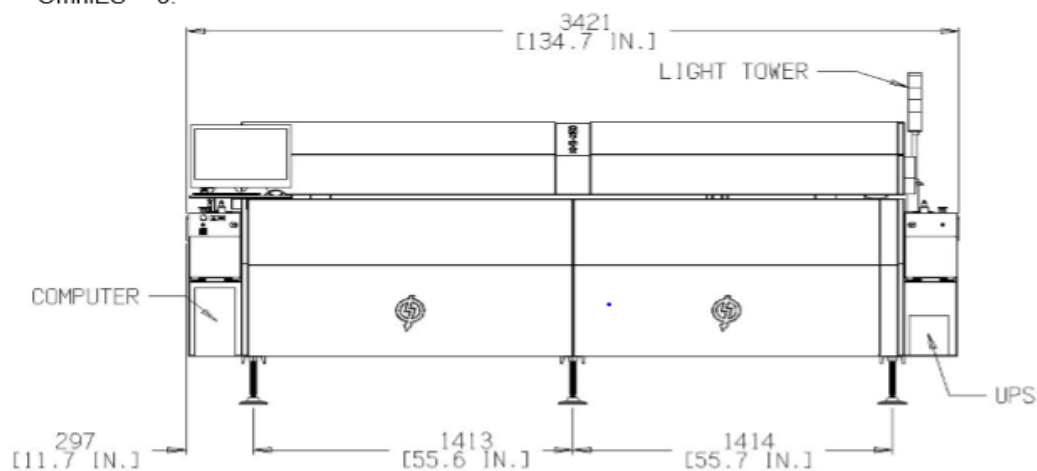
START-UP POWER REQUIREMENTS

	kVa	380 VAC	415 VAC	440 VAC	480 VAC
Base system power consumption	24	33.8 Amps	36.0 Amps	29.2 Amps	31.2 Amps
Add optional Rail Heaters	2.0	2.6 Amps	2.8 Amps	2.2 Amps	2.4 Amps
Add optional External Water Chiller	5.0	7.6 Amps	7.0 Amps	6.6 Amps	6.0 Amps

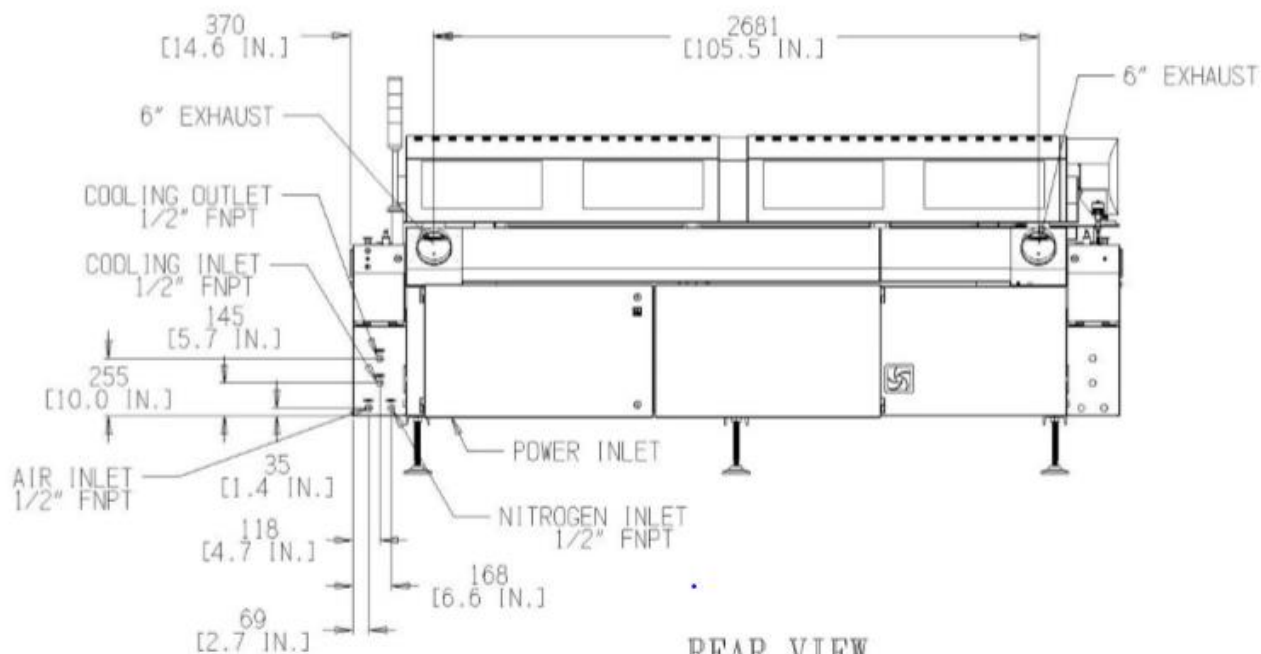
NOTE: Values listed above are maximum power consumption during full load start-up. Power consumption is lower at stabilized process conditions (shown below), but varies based on process parameters and product loading. Machine is considered "process-ready" when all recipe parameters are within their set-point range and the machine is ready to accept product. Typical loaded conditions draw 25-35% of full load value in a steady state operating environment.

SYSTEM DRAWINGS

Refer to the following facility drawings for front, rear, top, load, and unload side drawings of the OmniES™ 5.



FRONT VIEW



REAR VIEW

OmniES™ 7

FORCED CONVECTION REFLOW SYSTEM ENGINEERING DATA SHEET

CAUTION: Operation of this system at extreme setpoints for extended periods may cause damage to machine components and void the warranty.
 Chemicals used with this equipment must be compatible with Delrin, polyethylene, silicone, Teflon, aluminum, brass, copper, galvanized steel, and stainless steel.
 Failure to use compatible fluxes, cleaners, and other chemicals with this system will void the warranty.

SPECIFICATIONS

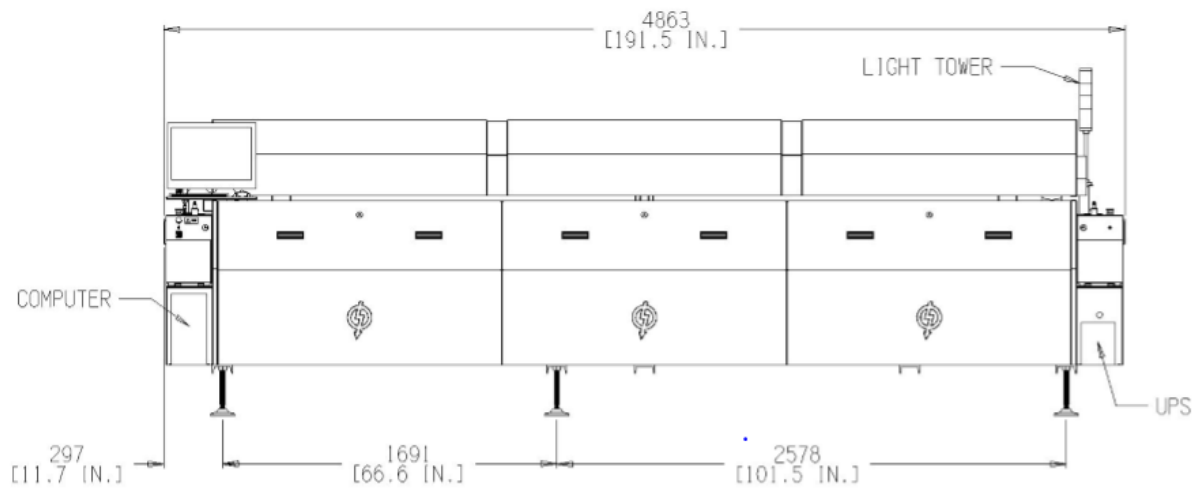
Required gas supply ¹	Both nitrogen (N ₂) and clean, dry, compressed gas (CDA) supply lines should be installed
Supply line pressure	552 - 690 kPa (80 - 100 psi)
Minimum available flow rate	57 m ³ /hr (2000 SCFH)
Typical nitrogen consumption to achieve <50ppm in fully loaded condition ^{2, 3}	“Optimized” Convection Settings: <20 m ³ /hr (700 SCFH) “Maximum” Convection Settings: <34 m ³ /hr (1200 SCFH)

Typical nitrogen consumption to achieve <1000ppm in fully loaded condition ^{2, 3}	“Optimized” Convection Settings: <14 m ³ /hr (500 SCFH) “Maximum” Convection Settings: <25 m ³ /hr (900 SCFH)
Typical “idle time” nitrogen savings with Closed Loop Nitrogen option	8 – 11 m ³ /hr (300 - 400 SCFH) @ “Maximum” Convection
Typical oxygen purge time ⁴	Ambient to full process ready state: <15 min.

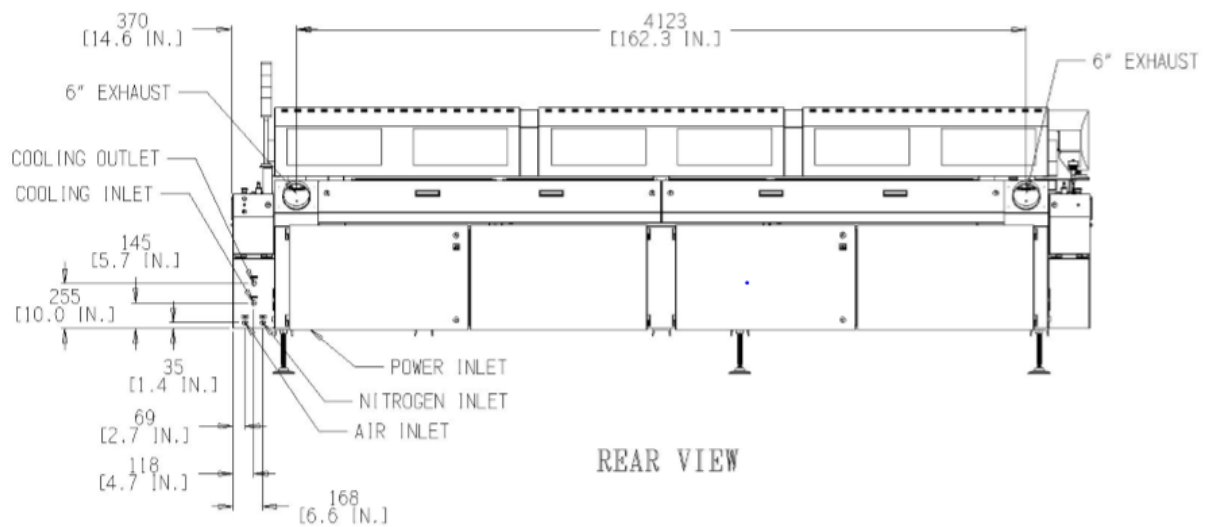
START-UP POWER REQUIREMENTS

	kVa	380 VAC	415 VAC	440 VAC	480 VAC
Base system power consumption	37.0	52.7 Amps	54.8 Amps	45.5 Amps	47.4 Amps
Add optional Rail Heaters	2.0	2.6 Amps	2.8 Amps	2.2 Amps	2.4 Amps
Add optional External Water Chiller	5.0	7.6 Amps	7.0 Amps	6.6 Amps	6.0 Amps

NOTE: Values listed above are maximum power consumption during full load start-up. Power consumption is lower at stabilized process conditions (shown below), but varies based on process parameters and product loading. Machine is considered “process-ready” when all recipe parameters are within their set-point range and the machine is ready to accept product. Typical loaded conditions draw 25-35% of full load value in a steady state operating environment.



FRONT VIEW



REAR VIEW

OmniES™ 10

FORCED CONVECTION REFLOW SYSTEM ENGINEERING DATA SHEET

CAUTION: Operation of this system at extreme setpoints for extended periods may cause damage to machine components and void the warranty.
Chemicals used with this equipment must be compatible with Delrin, polyethylene, silicone, Teflon, aluminum, brass, copper, galvanized steel, and stainless steel.
Failure to use compatible fluxes, cleaners, and other chemicals with this system will void the warranty.

POWER SPECIFICATIONS:

STANDARD

- 440-480 VAC, 3-phase, 60 Hz (4 wires: 3 phase, 1 ground)

OPTION

- 380-415 VAC, 3-phase, 50 Hz (5 wires: 3 phase, 1 neutral, 1 ground)

NOTE: Please consult the factory for special voltage and/or frequency requirements and specifications not listed.

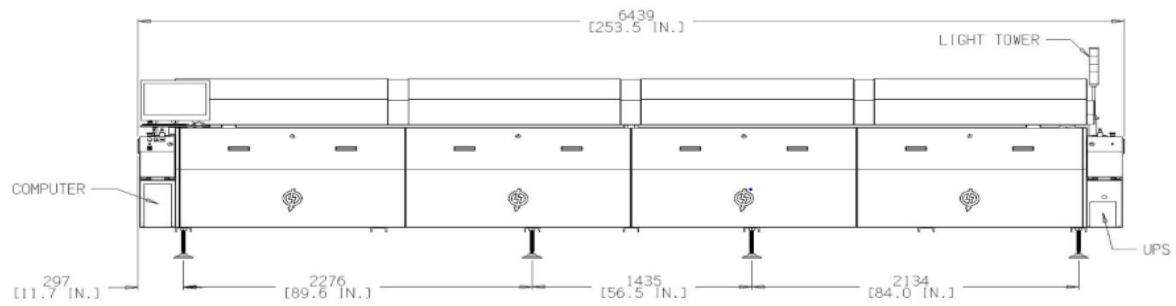
START-UP POWER REQUIREMENTS

	kVa	380 VAC	415 VAC	440 VAC	480 VAC
Base system power consumption	46.0	65.2 Amps	68.4 Amps	56.3 Amps	59.2 Amps
Add optional Rail Heaters	2.0	2.6 Amps	2.8 Amps	2.2 Amps	2.4 Amps
Add optional External Water Chiller	5.0	7.6 Amps	7.0 Amps	6.6 Amps	6.0 Amps

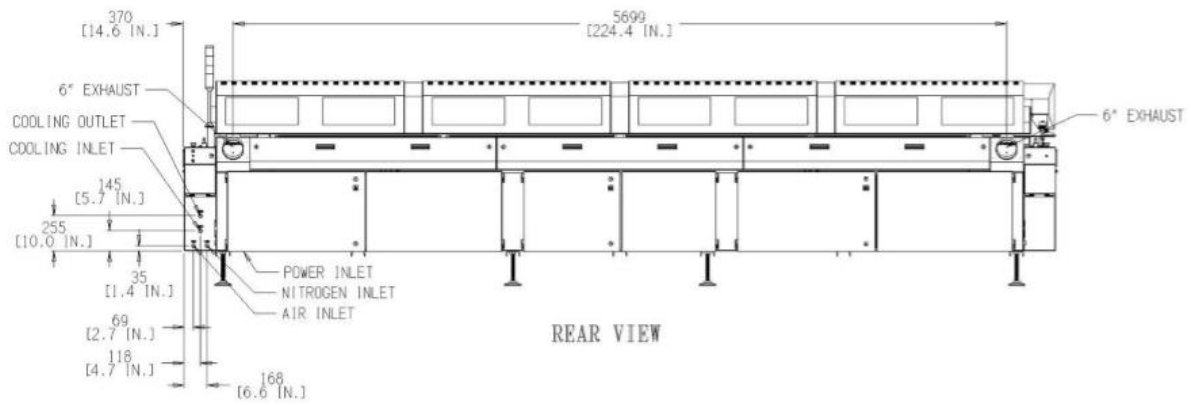
NOTE: Values listed above are maximum power consumption during full load start-up. Power consumption is lower at stabilized process conditions (shown below), but varies based on process parameters and product loading. Machine is considered "process-ready" when all recipe parameters are within their set-point range and the machine is ready to accept product. Typical loaded conditions draw 25-35% of full load value in a steady state operating environment.

Electrovert

TW EAE *Electronic Assembly Equipment*



FRONT VIEW



REAR VIEW

OmniMax™ 7

FORCED CONVECTION REFLOW SYSTEM ENGINEERING DATA SHEET

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Chemicals used with this equipment must be compatible with Delrin, polyethylene, silicone, Teflon, aluminum, brass, copper, galvanized steel, and stainless steel.
Failure to use compatible fluxes, cleaners, and other chemicals with this system will void the warranty.

POWER SPECIFICATIONS:

STANDARD

- 440-480 VAC, 3-phase, 60 Hz (4 wires: 3 phase, 1 ground)

OPTION

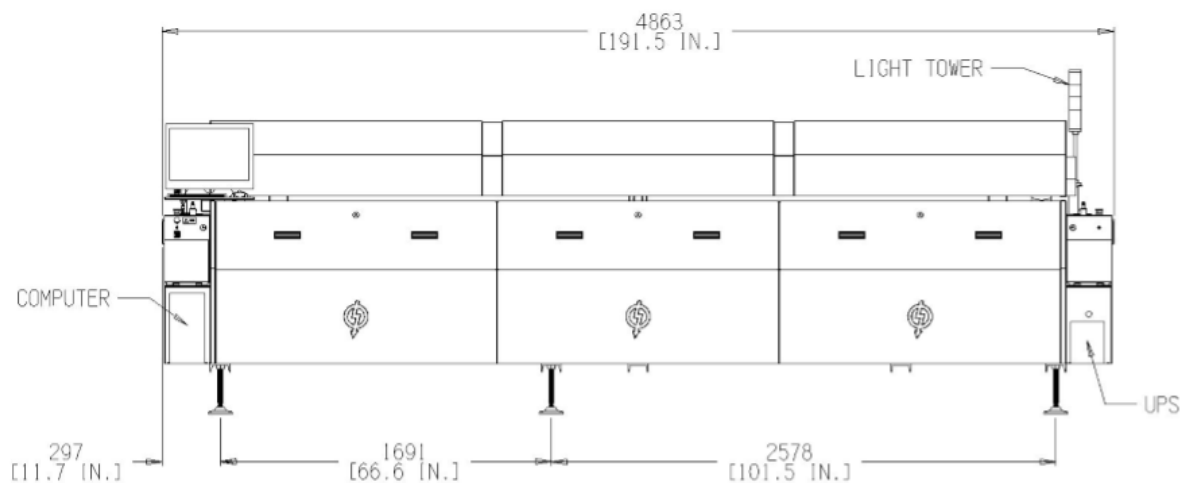
- 380-415 VAC, 3-phase, 50 Hz (5 wires: 3 phase, 1 neutral, 1 ground)

NOTE: Please consult the factory for special voltage and/or frequency requirements and specifications not listed.

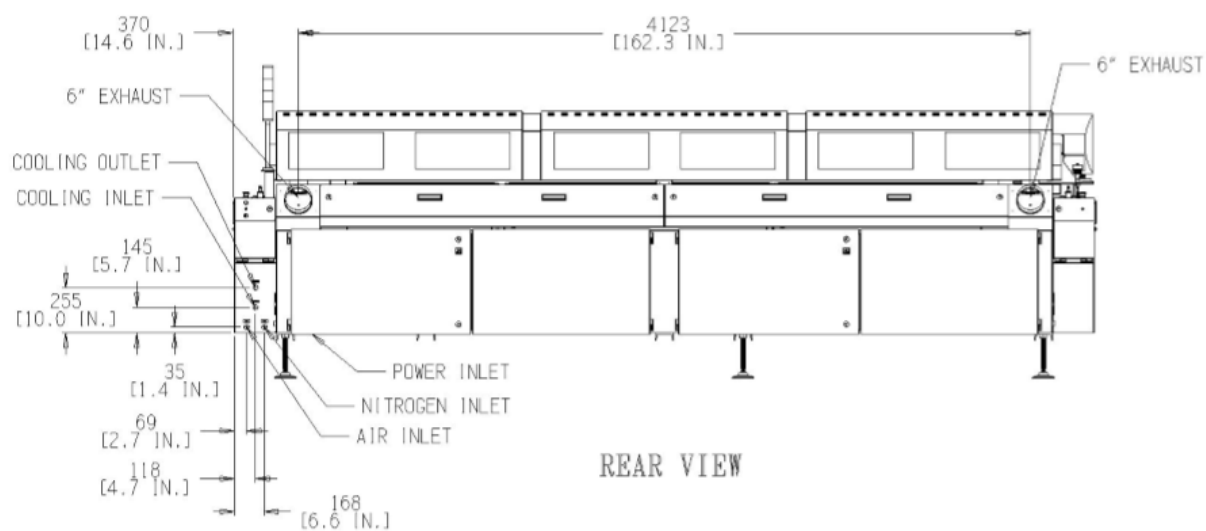
START-UP POWER REQUIREMENTS

	kVa	380 VAC	415 VAC	440 VAC	480 VAC
Base system power consumption	64.0	90.3 Amps	95.7 Amps	78.0 Amps	82.8 Amps
Fully optioned power consumption	73.0	103.0 Amps	108.2 Amps	88.9 Amps	93.6 Amps
Add optional Rail Heaters	2.0	2.6 Amps	2.8 Amps	2.2 Amps	2.4 Amps
Add optional External Water Chiller	5.0	7.6 Amps	7.0 Amps	6.6 Amps	6.0 Amps

NOTE: Values listed above are maximum power consumption during full load start-up. Power consumption is lower at stabilized process conditions (shown below), but varies based on process parameters and product loading. Machine is considered "process-ready" when all recipe parameters are within their set-point range and the machine is ready to accept product. Typical loaded conditions draw 20-25% of full load value in a steady state operating environment.



FRONT VIEW



REAR VIEW

OmniMax™ 10

FORCED CONVECTION REFLOW SYSTEM ENGINEERING DATA SHEET

CAUTION: Operation of this system at extreme setpoints for extended periods may cause damage to machine components and void the warranty. Chemicals used with this equipment must be compatible with Delrin, polyethylene, silicone, Teflon, aluminum, brass, copper, galvanized steel, and stainless steel. Failure to use compatible fluxes, cleaners, and other chemicals with this system will void the warranty.

START-UP POWER REQUIREMENTS

	kVa	380 VAC	415 VAC	440 VAC	480 VAC
Base system power consumption	82.0	115.3 Amps	123.0 Amps	99.6 Amps	106.3 Amps
Fully optioned power consumption	90.7	128.0 Amps	135.5 Amps	110.5 Amps	117.2 Amps
Add optional Rail Heaters	2.0	2.6 Amps	2.8 Amps	2.2 Amps	2.4 Amps
Add optional External Water Chiller	5.0	7.6 Amps	7.0 Amps	6.6 Amps	6.0 Amps

NOTE: Values listed above are maximum power consumption during full load start-up. Power consumption is lower at stabilized process conditions (shown below), but varies based on process parameters and product loading. Machine is considered “process-ready” when all recipe parameters are within their set-point range and the machine is ready to accept product. Typical loaded conditions draw 20-25% of full load value in a steady state operating environment.



TRAINING AT INSTALLATION

As part of the Installation process, ITW EAE offers a complimentary “up and running” training program. This covers the basic operation, maintenance and programming of the cleaner and associated options.

Training Summary

Customer Start-Up Assistance Training

- The FSE (field service engineer) will provide maximum of 4 hours of training for up to four process engineers)
- The FSE will provide a maximum of two hours of training for up to four operators.
- The FSE will provide a maximum of two hours of training for up to four maintenance technicians.
- The FSE will then demonstrate that the system performs to specification using the customer’s production materials

***NOTE:** The customer's personnel are expected to devote the entire time to the training program. Hours not devoted by the customer may not be “banked” for later use.

Additional Training

A full range of training courses are available covering operation, maintenance and process. Courses are conducted at our ITW EAE facility in Camdenton, MO.

For further information, including course descriptions and schedule please contact the Training Department or visit <http://www.itweae.com/services-and-support/americas>

NEED CONSUMABLES?

*For current pricing and availability please contact our Parts Department at parts@itweae.com.

*For any questions you may also contact us at 800-737-8110 Option 4.