

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.

I. GENERAL SYSTEM

STANDARD FEATURES

- Electromechanical power lift to provide computer controlled opening and closing of external hood, allowing full access to interior
- Hinged and/or removable access panels to all features on the equipment
- Computer access from front of machine
- Disposable filters at hood exhaust inlets to capture volatiles

MACHINE OPTIONS

- **Light Tower**
 - Software configurable for machine status indication (3 color: red, amber, green)
- **UPS Backup** (Uninterruptible Power Supply; 900 VA)
 - Integrated battery backup provides power to the control system and conveyor in the event of a power failure for automatic product evacuation from the process chamber
 - Audible and on-screen visual alarms
 - On-line battery charging; 30+ minutes of battery backup with a fully charged battery
 - Continuous monitoring of line power; on-board self-test diagnostics
- **SMEMA Interface**
 - Electrical equipment interface with connections at load and unload end of machine

NOTE: Due to the continuous nature of the reflow process, the system cannot be stopped if the downstream equipment is busy.
- **OmniCheck**
 - Redundant temperature and conveyor speed monitoring
 - Hardware consists of a T/C harness running through the process tunnel and a digital shaft encoder on the conveyor drive shaft; one (1) T/C is located in each zone
 - The redundant monitoring screen is password protected through the software's security feature
 - If any of the redundant T/C's or the redundant conveyor speed exceeds the process band setting the software takes the user programmable alarm action
- **IFC (Intelligent Flux Collection)**
 - Option of two (2) levels of flux collection offered depending on solder paste usage
 - **Level 1:** Low volume (*typical solder paste usage <10 kg/week*)
 - One (1) collection unit for fume evacuation from process chamber
 - **Level 2:** High volume (*typical solder paste usage >10 kg/week*)
 - Three (3) collection units for fume evacuation from process chamber

NOTE: Solder paste usage and subsequent machine maintenance may vary depending on paste formulation, thermal profile, and operating conditions.

- Patented multi-stage flux extraction system
- Air-to-air heat exchanger in stage #1
 - Adjustable manual flow controls
 - Typical compressed gas consumption: <8.5 m³/hr (5 SCFM) (*per unit*)
- Packed bed of steel balls for solvent trap in stage #2
 - Removable cartridge for ease of cleaning
 - Heaters mounted under cartridge for self-cleaning with user selectable self-clean intervals
- Drain jars with fill-level detection sensors
- Valves on inlet and outlet piping to allow maintenance of system without stopping production
- Thermocouple in each unit monitors and sends feedback to software to alarm when maintenance is required
- **Bar Code Scanner**
 - Supports 1D barcodes (max. 32 characters)
 - Supports 2D barcodes (max. 5 lines, 32 characters each)
 - User selects which line of data is used by the machine
 - Automatic recipe change over based on the board's barcode
 - Barcode data is one of the standard recorded parameters via the Data Logging feature, other oven parameters are user selectable
 - Barcode/Recipe association allows barcodes to be assigned to an existing recipe name
 - Recipe name does not have to be included in the barcode
 - Recipes may be stored in multiple locations
 - Multiple barcodes may be assigned to the same recipe
- **Lead-Free QA Test Vehicle**
 - Profile verification board that is compatible with most major OEM profilers with miniature T/C plugs
 - Single lane conveyor: 20" wide board with five (5) precision T/C blocks evenly spaced across width
 - Dual lane conveyor: 8" wide board with three (3) precision T/C blocks evenly spaced across width

II. FORCED CONVECTION HEATING MODULE

STANDARD FEATURES

- Ten (10) heating zones (top forced convection heating technology)
- One (1) forced convection blower on the top in each zone
- Blowers and fan are one balanced unit – easily removed in five (5) minutes
- Closed-loop blower control with blower speeds from 1200-2640RPM (60RPM increments)
- Blower failure detection with feedback to computer and on-screen alarm
- Electromechanical power lift to provide computer controlled opening and closing of upper part of heating chamber allowing full access to process chamber
- Quick change atmosphere seals
- 100°C (212°F) zone-to-zone segregation to assist in lead-free profiles (at 350°C [662°F])

OPTIONS

- **ES+ Full Convection**
 - Provides active topside and bottomside convection

NOTES:

- Limits maximum pin chain conveyor width to 457 mm (18.0 in.).
- Not compatible with 610 mm (24.0 in.), 660 mm (26.0 in.), or 1016 mm (40.0 in.) conveyor width options.
- **Thirteen (13) Heating Zones**

- Provides additional heating capacity for increased throughput or product mass
- Additional zones allow for fine-tuning of thermal profiles
- **IHTSC** (Independent High Temperature Safety Circuit) which provides backup against thermal runaway
 - Optional safety circuit trips at 417°C (782°F) and cuts power to all heaters via main contactor
 - Independent of machine process controls (not dependent on computer or software)
 - Main disconnect must be reset before machine can be powered up again after the safety circuit is tripped

SPECIFICATIONS

Heated Chamber Length	3855 mm (151.8 in.) dimension does not include the length of the cooling module
Zone dimensions (20" Process Chamber)	Length: 345 mm (13.6 in.) each [259 mm (10.2 in.) for 13-zone] Width: 739 mm (29.1 in.) each
Heater power rating	10-Zone: Three (3) kW in Zones 2-8 Five (5) kW in Zones 1, 9, & 10 13-Zone: Three (3) kW in Zones 2-11 Six (6) kW in Zones 1, 12, & 13 40" Process Chamber: Six (6) kW in All 13 Zones
Maximum heating capacity	10-Zone: 36 kW 13-Zone: 48 kW 40" Process Chamber: 78 kW
Heater control	Proportional-Integral-Derivative (PID) heater control; software adjustable
Thermocouples	K-type; grounded junction; stainless steel with stainless steel sheath
Heater temperature range	Zones 1-6: 250°C (482°F) Zones 7-8: 300°C (572°F) [Zones 7-11 for 13-zone] Zones 9-10: 350°C (662°F) [Zones 12-13 for 13-zone] Note: Measuring forced convection gas temperature
High temperature protection	Standard machine controls have 3 levels of built-in thermal protection for the heating section: <ul style="list-style-type: none"> • Process temperature deviation alarms (factory set defaults, user selectable parameters) • High temperature limit alarm (factory set default at 425°C [797°F]) • Thermocouple failure detection (non-adjustable)
Process control accuracy	±1°C (±2°F) at no-load steady state
Bare board maximum ΔT	Without Rail Heaters: ±3°C (±6°F) With Rail Heaters: ±1.5°C (±3°F) Note: Typical lead-free process temperatures. Max. ΔT for 40" Process Chamber is ±6°C (±12°F).
Forced convection blowers	High volume forced convection; high temperature sealed bearing; built-in thermal overload protection; class F insulation; re-usable silicone gaskets; quick release electrical connections
Typical start-up time ¹	Ambient to full process ready state: <30 min.

NOTE¹: Start-up time may be influenced by convection speed and process temperature setpoints.

III. FORCED CONVECTION AIR COOLING MODULE

NOTE: For inert atmosphere machines, the standard Forced Convection Air Cooling Module is not installed. Refer to Section V.

STANDARD FEATURES

- Access to cooling zones is independent of heated chamber section
- Three (3) high volume forced convection blowers on top
- Blowers and fan are one balanced unit – easily removed in five (5) minutes
- Closed-loop blower control with blower speeds from 1200-2640RPM (60RPM increments)
- Blower failure detection with feedback to computer and on-screen alarm
- Exhaust in bottom cooling pan beneath process area to reduce potential for flux dripping
- Electromechanical power lift to provide computer controlled opening and closing of upper part of cooling module allowing full access to process chamber
- Thermocouples in Cooling Zones monitor cooling zone temperature
 - Thermocouples monitor forced air convection temperature providing alarm/shutdown if cooling system rises above alarm setpoint

OPTIONS

- **Active Cooling** in lieu of standard top cooling
 - Utilizes chilled water heat exchangers for enhanced product cooling
 - Latching system and external quick disconnects for the water lines allow easy access to the heat exchanger for maintenance and low production downtimes
 - Solenoid valve on chilled water inlet remains on during controlled machine shutdown
 - Flow sensors on water outlets from heat exchangers provide alarms if there is no flow of chilled water through the system
 - **Active Bottom Side Cooling**
 - Same features as active top side cooling but located underneath process area to extend maintenance intervals
 - Stainless steel cover over process area is sloped for flux drainage and contains cascading catch plates to reduce possibility of flux dripping onto product
 - **Active Top and Bottom Cooling**
 - Three (3) cooling zones top and bottom
 - Combined features of top and bottom cooling to provide extensive product cooling
 - **External Cooling Fans**
 - Bank of product cooling fans mounted above conveyor at the unload end of machine to reduce board exit temperatures
 - **Process Volatile Exhaust Filter**
 - Filter box with removable/cleanable corrugated metal filter mounted at exhaust inlet on bottom cooling pan
 - Traps process volatiles at the machine level to prevent exhaust system contamination
- NOTE:** Allow for an additional 25 mm (1.0 in.) water gauge pressure drop at the unload end machine exhaust port.

SPECIFICATIONS

Cooling chamber length	1293 mm (50.9 in.)
Cooling temperature alarm range	0° – 130°C (32° – 266°F) Upper limit setpoint measuring forced convection gas temperature

Forced convection blower	High volume forced convection; high temperature sealed bearing; built-in thermal overload protection; class F insulation; re-usable silicone gaskets; quick release electrical connections
Chilled water requirements (Active Cooling Option)	(These specifications are listed for factory supplied chilled water requirements only.)
Flow Rate	11.4 – 18.9 l/min. (3.0 - 5.0 US gal/min.)
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)

IV. INERT ATMOSPHERE HEATING MODULE (OPTIONAL)

STANDARD FEATURES

- Sealed upper and lower heating chambers with inerting gas introduced directly to the chamber
- Gas controls including: solenoid valve on feed line, manual safety shut-off valve, pressure regulator and pressure gauge, adjustable metered flow rate via manual controls
- Computer controlled gas selector solenoid to permit recipe selection of nitrogen or compressed gas process atmosphere
- Two (2) atmosphere isolation curtain modules (one before the first heating zone, one after the cooling section) prevent air infiltration to the process chamber. Each curtain module allows quick removal for ease of maintenance
- Sensors on the top heating chamber and exhaust outlets automatically shut off the main nitrogen feed when the chamber is opened or when the exhaust flow rate is too low
- Quick-purge automatic nitrogen purge solenoid for reducing oxygen purge time

OPTIONS

- **Integrated Oxygen Analyzer** (wet-cell oxygen monitor)
 - On-screen display with user selectable recipe specific alarm parameters; 0 - 5000 ppm range
 - O₂ sampling port in reflow zone with software monitored sampling frequency
 - Valve arrangement to permit purging of instrument and sampling of feed nitrogen
 - In-line particle filter and overpressure protection for the O₂ analyzer wet cell module

NOTE: Use only de-ionized or distilled water when replenishing evaporated fluids in the O₂ analyzer wet cell.
- **Closed Loop N₂ Control** automatically controls nitrogen (N₂) feed rate to reflow zones to maintain at or below computer set PPM level within the process chamber. (Must purchase Integrated Oxygen Analyzer with this option.)
 - Designed to maximize nitrogen savings during machine idle times
 - Includes Compressed Air Injection system that provides precision control of oxygen content via manually adjustable control valve
 - Control range 10 - 4350ppm +15% (±10% with compressed air injection)

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.

NOTE¹: External pressure regulators and gauges, shut-off valves, and filters are to be installed by the customer on the gas supply lines at the machine inputs.

NOTE²: Actual nitrogen consumption is strongly influenced by machine configuration and operating conditions. Severe conditions may require higher consumption rates to achieve low ppm levels. Factors influencing consumption include:

- Product width, height, required component clearance, and throughput loading or board spacing
- Forced convection speed settings in heating and cooling zones
- Conveyor configuration (Combination Pin Chain / Mesh Belt or Center Board Support).

NOTE³: Preheat zones may be higher due to load end effect and product throughput.

NOTE⁴: Purge times may be influenced by convection speed and process temperatures.

V. INERT ATMOSPHERE COOLING MODULE (OPTIONAL)

NOTE: For standard air atmosphere machines, the Inert Atmosphere Cooling Module is not installed. Refer to Section III.

STANDARD FEATURES

- Sealed cooling zones with separate nitrogen feed providing recirculated inert product cooling after reflow
- Access to cooling zones is independent of heated chamber section
- Three (3) high volume forced convection blowers on top
- Blowers and fan are one balanced unit – easily removed in five (5) minutes
- Closed-loop blower control with blower speeds from 1200-2640RPM (60RPM increments)
- Blower failure detection with feedback to computer and on-screen alarm
- Electromechanical power lift to provide computer controlled opening and closing of upper part of cooling module allowing full access to process chamber
- Sensor on the top cooling chamber automatically shuts off the main nitrogen feed when the chamber is opened
- Latching system and external quick disconnects for the water lines allow easy access to the heat exchanger for maintenance and low production downtimes
- Thermocouples in Cooling Zones monitor cooling zone temperature
 - Thermocouples monitor forced gas convection temperature providing alarm/shutdown if

- cooling system rises above alarm setpoint
- Solenoid valve on chilled water inlet remains on during controlled machine shutdown
- Flow sensors on water outlets from heat exchangers provide alarms if there is no flow of chilled water through the system

OPTIONS

- **Bottom Side Cooling** in lieu of standard top cooling
 - Same features as standard top side cooling but located underneath process area to extend maintenance intervals
 - Stainless steel cover over process area is sloped for flux drainage and contains cascading catch plates to reduce possibility of flux dripping onto product
- **Top and Bottom Cooling**
 - Three (3) cooling zones top and bottom
 - Combined features of top and bottom cooling to provide extensive product cooling
- **Integrated OEM Liquid-to-Air Cooler (non-refrigerated)**
 - Closed-loop ambient cooled water in space saving footprint
- **Integrated OEM Refrigerated Chiller**
 - Closed-loop chilled water in space saving footprint
- **Spare Standard Heat Exchanger** provides one (1) spare radiator for the cooling section on inert atmosphere cooling modules
 - Enables quick exchange of the radiators during maintenance of the cooling section
- **External Cooling Fans**
 - Bank of product cooling fans mounted above conveyor at the unload end of machine to reduce board exit temperatures

SPECIFICATIONS

Cooling chamber length	1293 mm (50.9 in.)
Cooling temperature alarm range	0° – 130°C (32° – 266°F) Upper limit setpoint measuring forced convection gas temperature
High temperature protection	Standard machine controls have two (2) levels of built-in thermal protection for the cooling section: <ul style="list-style-type: none"> • High temperature limit alarm (factory set defaults, user selectable parameters) • Thermocouple failure detection (non-adjustable)
Forced convection blowers	High volume forced convection; high temperature sealed bearing; built-in thermal overload protection; class F insulation; re-usable silicone gaskets; quick release electrical connections
Chilled water requirements	(These specifications are listed for factory supplied chilled water requirements only.)
Flow Rate	11.4 – 18.9 l/min. (3.0 - 5.0 US gal./min.)
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.

VI. CONVEYOR MODULE

STANDARD FEATURES

- Mesh belt conveyor
 - 304 stainless steel, 12.7 mm (0.5 in.) pitch
- AC motor with closed-loop speed control; pulse feedback from digital shaft encoder
- Product input and output photocells for on-screen product monitoring and recipe specific work-in-process tracking
- Conveyor direction: left-to-right

OPTIONS

- **Pin Chain Conveyor** in lieu of standard mesh belt conveyor
 - Semi-automatic chain oiler system for pin chain conveyor
 - Recipe selectable, computer controlled motorized width adjust
 - Standard pin length is 4.8 mm (0.189 in.). By request, 3 mm (0.118 in.) and 7.4 mm (0.291 in.) are also available.
- **Combination Conveyor**
 - Single lane pin chain conveyor with standard mesh belt conveyor
 - Semi-automatic chain oiler system for pin chain conveyor
 - Recipe selectable, computer controlled motorized width adjust for the Pin Chain Conveyor system
 - Standard pin length is 4.8 mm (0.189 in.). By request, 3 mm (0.118 in.) and 7.4 mm (0.291 in.) are also available.
- **Pin Chain Conveyor with CBS** (Center Board Support) in lieu of standard mesh belt conveyor
 - Single lane pin chain conveyor with synchronized steel product support chain
 - Semi-automatic chain oiler system for pin chain and CBS conveyors
 - Recipe selectable, computer controlled motorized width adjust
 - CBS automatic height retract by 20.5 mm (0.81 in.) when board support is not required
 - CBS computer controlled motorized width positioning and vertical retraction
 - Park feature that allows the CBS to be parked in a location that does not affect process
- **SMEMA 35mm Dual Track Dual Lane Pin Chain Conveyor System** in lieu of the standard mesh belt conveyor
 - 35mm distance between the two (2) center rails for SMEMA compliance
 - Automated chain oiler system for each pin chain conveyor
 - Recipe selectable, computer controlled motorized width adjust for each process lane
 - Independent product input and output photocells on each process lane for on-screen product monitoring and recipe specific work-in-process tracking
 - Independent track speed control for each process lane allowing for mixed product throughput
- **SMEMA 35mm Dual Track Dual Lane Combination Conveyor System** in lieu of the standard mesh belt conveyor
 - Dual lane pin chain conveyor with standard mesh belt conveyor driven by lane #1
 - 35mm distance between the two (2) center rails for SMEMA compliance
 - Automated chain oiler system for each pin chain conveyor
 - Recipe selectable, computer controlled motorized width adjust for each process lane
 - Independent product input and output photocells on each process lane for on-screen product monitoring and recipe specific work-in-process tracking
 - Independent track speed control for each process lane allowing for mixed product throughput
- **SMEMA 35mm Dual Track/Dual CBS Dual Lane Conveyor System** in lieu of the standard mesh belt conveyor
 - Dual lane pin chain conveyor with synchronized steel product support chain in each process lane

- 35mm distance between the two (2) center rails for SMEMA compliance
 - Automated chain oiler system for each pin chain and CBS conveyor
 - Recipe selectable, computer controlled motorized width adjust for each process lane
 - Independent product input and output photocells on each process lane for on-screen product monitoring and recipe specific work-in-process tracking
 - Independent track speed control for each process lane allowing for mixed product throughput
 - CBS automatic height retract by 20.5 mm (0.81 in.) when board support is not required
 - CBS computer controlled motorized width positioning and vertical retraction
 - Park feature that allows the CBS to be parked in a location that does not affect process
- **Auto Oilers**
- Allows the computer control of the required oiling maintenance of the pin chain conveyor options (includes auto oiler for CBS conveyor, if equipped)
- **Patented RailHeat** tubular heaters located in pin chain conveyor rails to fine-tune temperature distribution across the process width
- Mounted to the pin chain conveyor rails and positioned in the last 1½ zones of the heated process chamber
 - Reduced thermal gradients and additional process flexibility through independently controlled edge temperature setpoints
 - Maximum setpoint limited to 300°C (572°F)
- NOTE:** RailHeat option NOT available on SMEMA 35mm Dual Track conveyor systems.
- **Right-to-Left Conveyor** in lieu of standard left-to-right operation
- **610 mm (24 in.) Board Width Capability**
- Offers flexibility to run larger product through standard process chamber
- NOTES:**
- Minimum conveyor width is reduced to 102 mm (4.0 in.).
 - If CBS is ordered it will not park under the fixed rail and will be limited to 51 mm (2.0 in.) minimum width.
 - Thermal performance at the outer 51 mm (2.0 in.) edges will be degraded.
 - Not compatible with the ES+ Full Convection option.
- **660 mm (26 in.) Process Width**
- NOTE:** Not compatible with the ES+ Full Convection option.
- **1016 mm (40 in.) Process Width**
- NOTES:**
- If ordered as mesh belt only it comes with heavy duty 1092 mm (43 in.) wide belt for processing 1067 mm (42 in.) wide product.
 - Not compatible with the ES+ Full Convection option.

SPECIFICATIONS

Conveyor speed	13 to 178 cm/min (5 to 70 in/min)
Speed accuracy	±1.0 cm/min (±0.4 in/min)
Mesh belt process width	559 mm (22 in.) overall belt width 508 mm (20 in.) process width 457 mm (18 in.) maximum process with combo conveyor
Pin Chain process width	Min: 51 mm (2.0 in.) Max: 508 mm (20.0 in.) [see drawings for additional options]
Dual Track process width	Min: 70 mm (2.75 in.) *Max: 250 mm (9.84 in.) [see drawings for additional options] Note: Minimum of 35mm spacing required between tracks.

Center Board Support	<p>Single lane process width: Min: 25 mm (1.0 in.) from fixed rail Max: 25 mm (1.0 in.) from moveable rail</p> <p>Dual lane process width: Min: 25 mm (1.0 in.) from fixed rail Max: 45 mm (1.75 in.) from moveable rail</p> <p>Note: Requires 3 mm (0.12 in.) clear track on bottom of circuit board. See drawings for option restrictions.</p>
Conveyor chain pin length	<p>Std: 4.8 mm (0.189 in.) Opt: 3.0 mm (0.118 in.), 7.4 mm (0.291 in.)</p>
Conveyor weight limit	100 lbs maximum evenly distributed over the conveyor length
Conveyor rail parallelism	±0.5 mm (0.020 in.) cold
Process height	<p>Belt: 70 mm (2.75 in.) Rail: 45 mm (1.75 in.) above; 25 mm (1.0 in.) below with belt; 50 mm (2.0 in.) below without belt</p> <p>Note: Dual Track and OmniCheck options reduce process heights by 6 mm (0.25 in.).</p>
Conveyor height from floor	<p>Belt: 799 – 961 mm (31.5 - 37.8 in.) Rail: 828 – 990 mm (32.6 - 39.0 in.)</p>
Semi-automatic pin chain oilers	<p>Located at load end of conveyor rails; manual valve control and drip-rate adjustment</p> <p>Note: Typical configuration of oilers uses 10cc's of oil per lubrication (approximately one drip every 7 to 10 seconds).</p>
Automatic pin chain oilers	<p>Dry, clean compressed air Minimum supply pressure 69 kPa (10 psi)</p>

VII. SYSTEM CONTROLS

HARDWARE

- Mechanical main power disconnect
- ESD grounding jacks at load and unload ends
- All systems designed to meet NFPA 79, UL 508, and EN 60204
- Four (4) emergency stop switches; located on both the front and rear of the load and unload ends
- Standard PC-based computer control with the following minimum hardware setup:
 - Intel Atom Dual Core (1.66 GHz processor or faster)
 - 1Gb RAM
 - DVD+/-RW; 80Gb hard drive
 - 19" Widescreen LCD monitor, PC keyboard, and trackball
 - Two (2) USB 2.0 ports rear access; two (2) USB 2.0 ports front access
 - One available Ethernet Card for use in connecting the machine's computer to the customer's network via Ethernet

SOFTWARE

- Microsoft Windows® 7, 64-bit Operating System
- On-screen indexed help, maintenance screens, and system debug utility screens
- Real-time graphic animation of system with display of process parameters, setpoints,

- alarm status, and product flow tracking
- Recipe manager; stores a virtually unlimited number of recipes for rapid process setup
- Integrated software timer utility providing programmable seven-day automatic start/stop timer
- Alarm screen containing user configurable alarm parameters, actions, alarm and process deadbands
- Print capability provides recipe printing as well as on-line alarm logging
- History log stores machine events such as recipe changes, alarms, and start/stop functions to disk
- Software controlled thermocouple failure detection
- On-screen help
- Data logging

VIII. 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 (10-Zone)

	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.

PROCESS-READY REQUIREMENTS (10-Zone)

	kW	380 - 415 VAC	440 - 480 VAC
Base system power consumption	11.8	16.4 – 18.0 Amps	14.2 – 15.5 Amps

NOTE: Loads on the machine are single phase, thus load balancing is dependent on the options selected. Actual line amperage may vary slightly from the values given above. The machine is equipped with a main disconnect switch which is not fused. It is recommended that the main supply power is supplied to the machine via a wall-mounted fused disconnect in accordance with local codes.

NOTE: To comply with EMC Directive 89/336/EEC on electromagnetic compatibility, power cables to the machine must be run in rigid or flexible metal conduit.

IX. 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.

X. ELECTRICAL CODES / COMPLIANCE

STANDARD FEATURES

- **(UL) UNDERWRITERS LABORATORY** (440 - 480 VAC Machines)
Listed for Factory Automation Equipment, File #181408. Testing to specifically include:
 - Standard for Industrial Control Equipment, Part 1
 - Underwriter's Laboratory (UL) 508
 - National Electrical Code (NEC), ANSI/NFPA 70-93
 - Electrical Standard for Industrial Machinery, NFPA 79-91

MACHINE OPTIONS

- **CE COMPLIANCE** (380 - 415 VAC Machines)
Declaration of Conformance is based on compliance to European Directives 2006/42/EC, 2006/95/EC, 2004/108/EC
 - 2006/42/EC based on the following European Harmonized Standards:
 - EN 12100
 - EN 60204-1: 2006 Low Voltage Directive
 - EN 61000-6-2: 2005
 - EN 61000-6-4: 2007

XI. PHYSICAL CHARACTERISTICS

Dimensions	
Length	6439 mm (253.5 in.)
Width	1367 mm (53.8 in.) [see drawings for additional options]
Height ¹	1241 mm (48.9 in.)
Leveling Legs	95-257 mm (3.7-10.1 in.)
Conveyor Height	
Mesh Belt	799 – 961 mm (31.5 - 37.8 in.)
Pin Chain	828 – 990 mm (32.6 - 39.0 in.)
Access Clearance	
Front	199 mm (7.8 in.)
Rear	1010 mm (39.8 in.)
Height ¹	1598 mm (62.9 in.)
Machine Weight (20" Process Chamber)	
Per Leg	250 kg (550 lbs.)
Total	2000 kg (4400 lbs.)
Noise Levels ²	
Front	64 dBA
Rear	65 dBA
Load End	64 dBA
Unload End	66 dBA

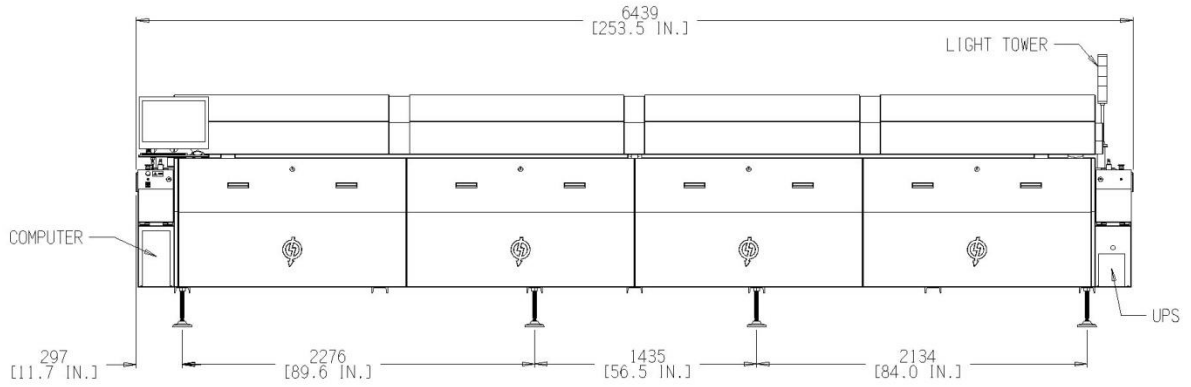
NOTE¹: The height dimensions listed exclude the leveling legs and the light tower.

NOTE²: The noise levels listed were measured at a 0.91 m (3.0 ft.) distance from the equipment per (US) OSHA standards.

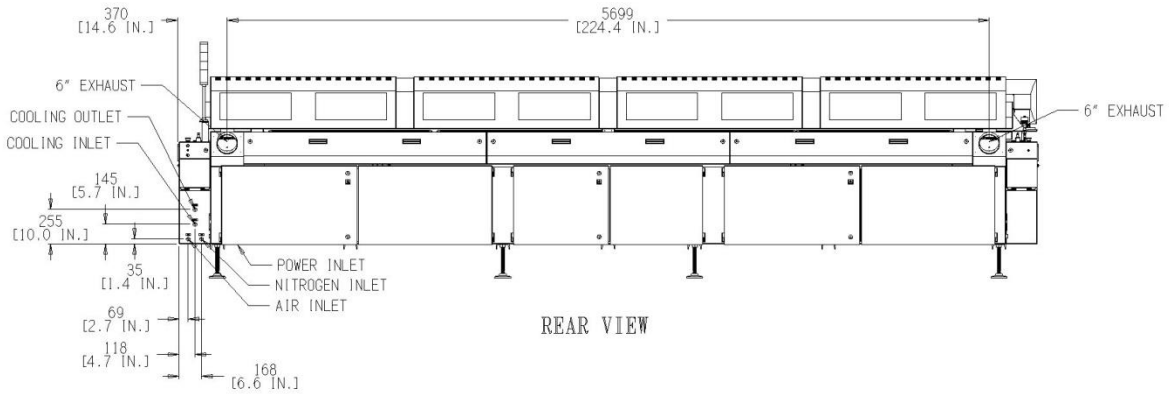
XII. SYSTEM DRAWINGS

Refer to the following facility drawings for front, rear, top, load, and unload side drawings of the OmniES™ 10.

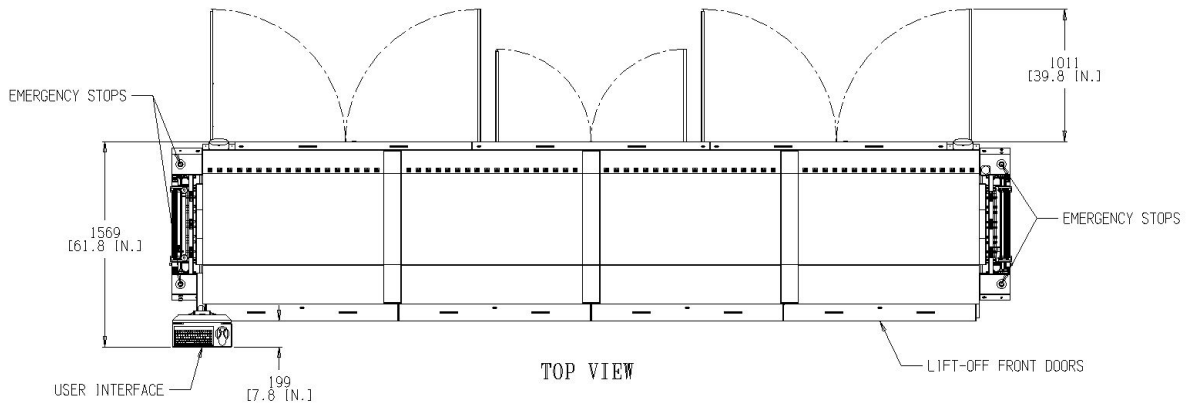
OmniES™ 10



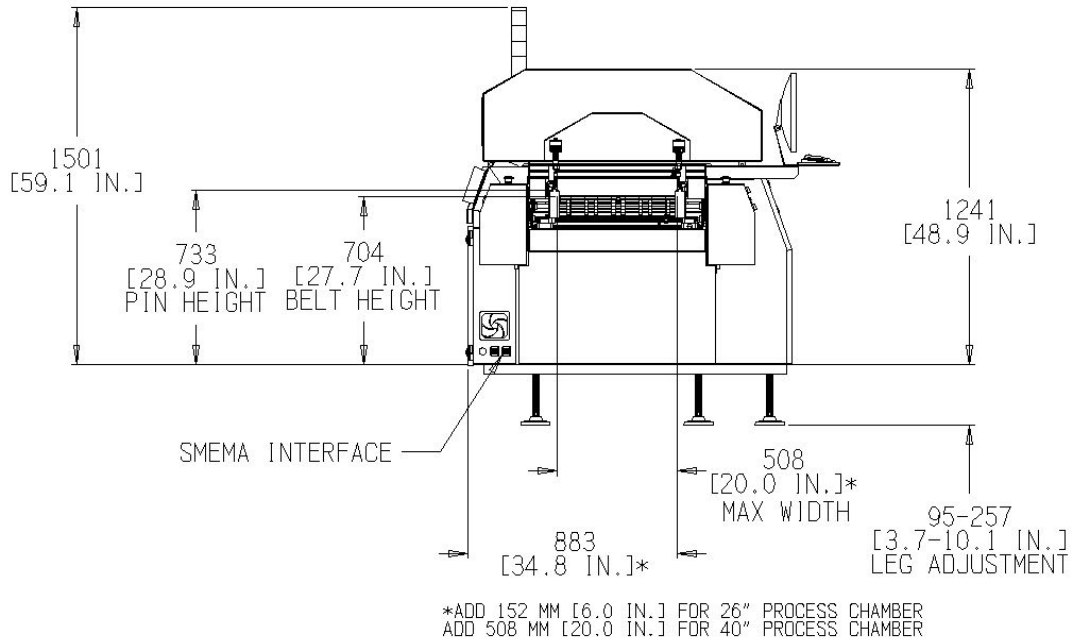
FRONT VIEW



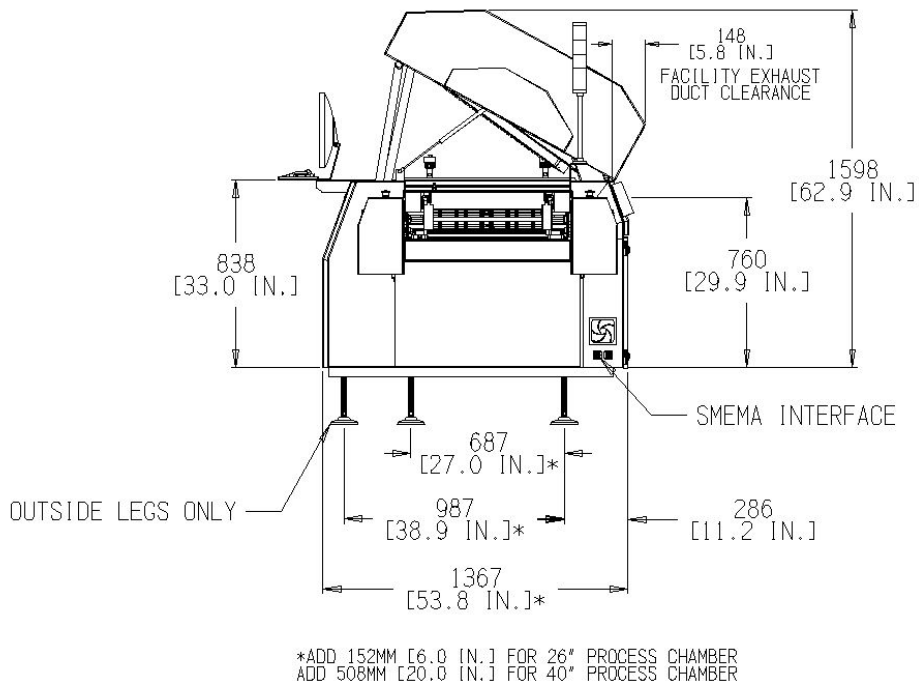
REAR VIEW



TOP VIEW

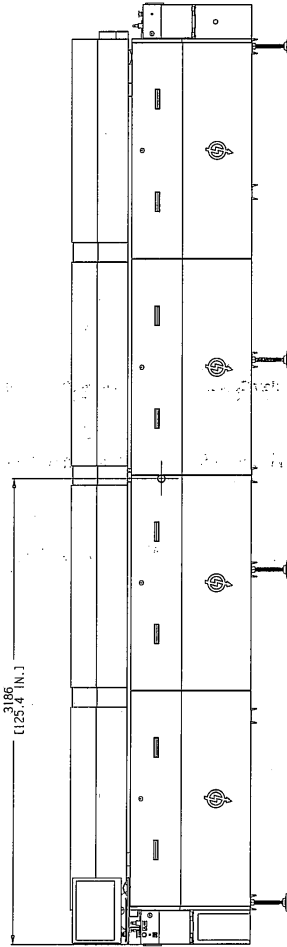


LOAD VIEW

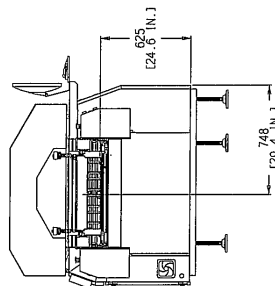


UNLOAD VIEW

OMNIESIO Center of Gravity



FRONT VIEW



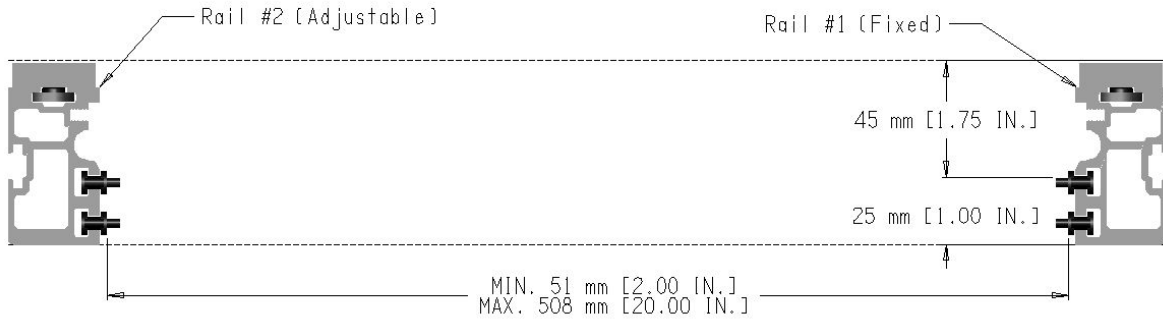
LOAD VIEW

XIII. CONVEYOR DRAWINGS

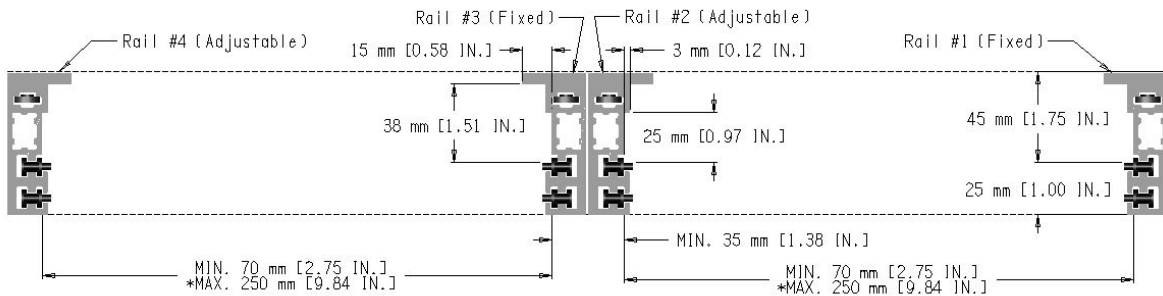
Refer to the following drawings for conveyor configurations/dimensions of the OmniES™ 10.

20" Process Chamber Options:

Single Lane 20" Pin Chain Conveyor

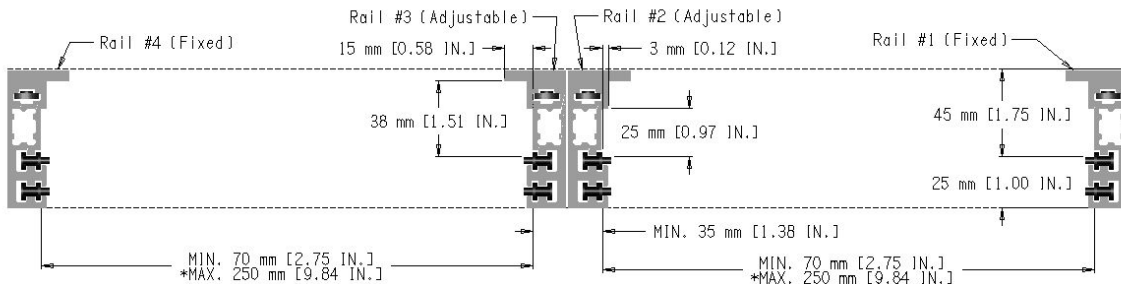


**20" Dual Track Pin Chain Conveyor
(Rails #1&3 Fixed, Rails #2&4 Adjustable)**



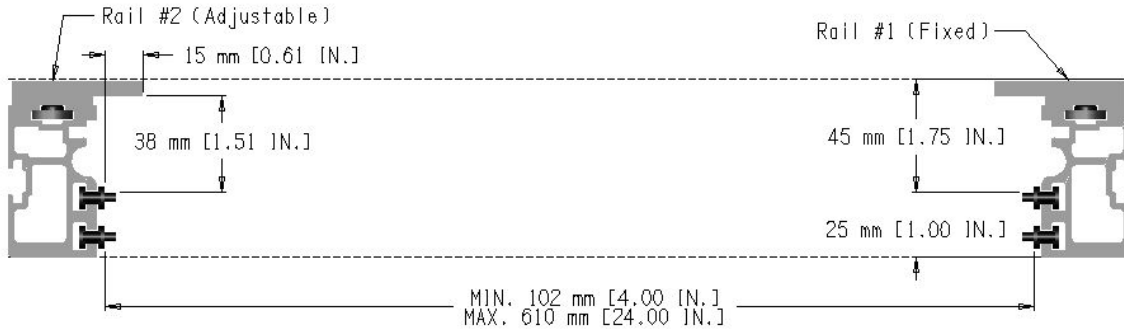
*These are the standard factory settings. If specified, maximum width can be set to SMEA Type A spec of 216 mm (8.50 IN.). Rail #3 may be manually positioned to obtain different maximum conveyor widths. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 503 mm [19.70 IN.].

**20" Dual Track Pin Chain Conveyor
(Rails #1&4 Fixed, Rails #2&3 Adjustable)**

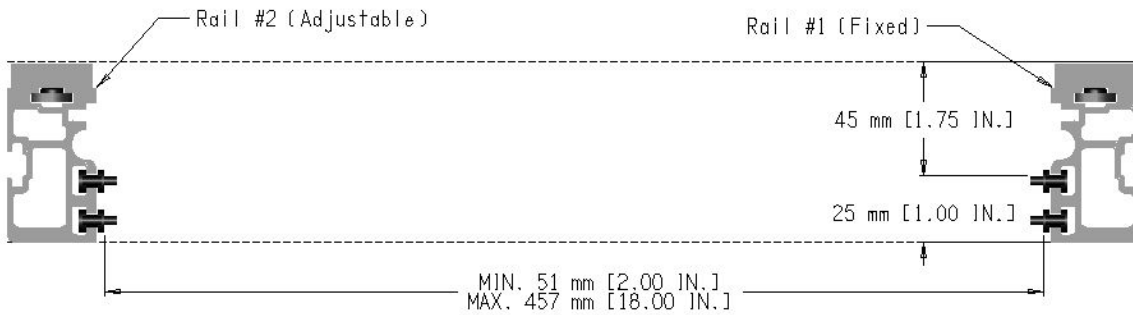


*These are the maximum settings. If specified, rails #1&4 can be set to reduced maximum widths. Rails #2&3 are independently adjustable and computer controlled. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 500 mm [19.70 IN.].

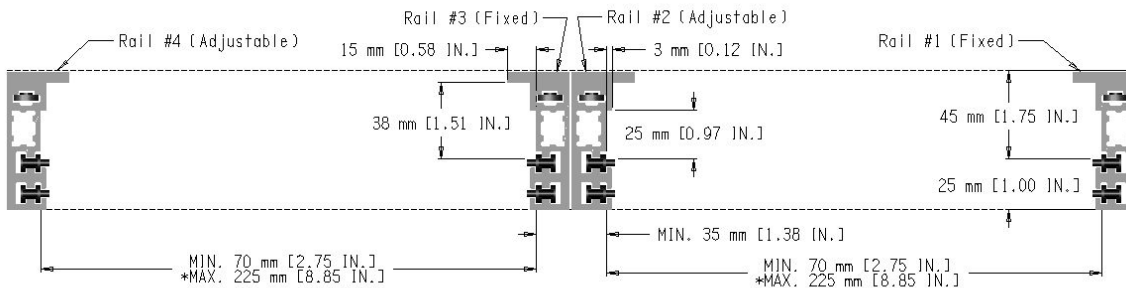
Single Lane 24" Pin Chain Conveyor



Single Lane 18" ES+ Pin Chain Conveyor

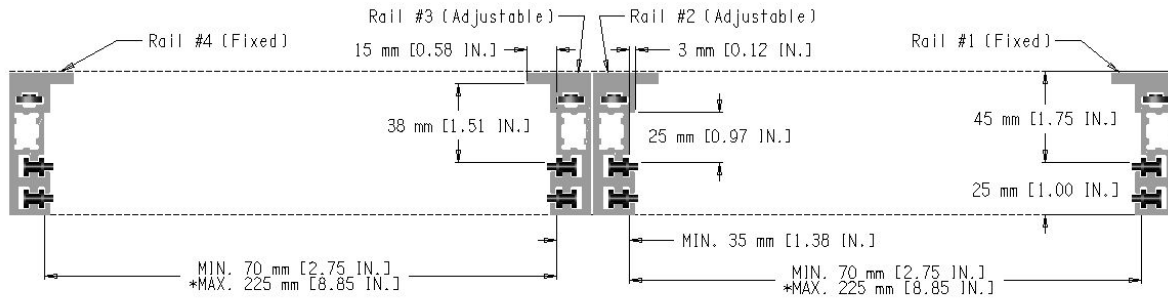


18" ES+ Dual Track Pin Chain Conveyor (Rails #1&3 Fixed, Rails #2&4 Adjustable)



*These are the standard factory settings. If specified, maximum width can be set to SMEMA Type A spec of 216 mm (8.50 IN.).
 Rail #3 may be manually positioned to obtain different maximum conveyor widths.
 Maximum combined widths (Lane #1 + Lane #2) cannot exceed 450 mm [17.71 IN.].

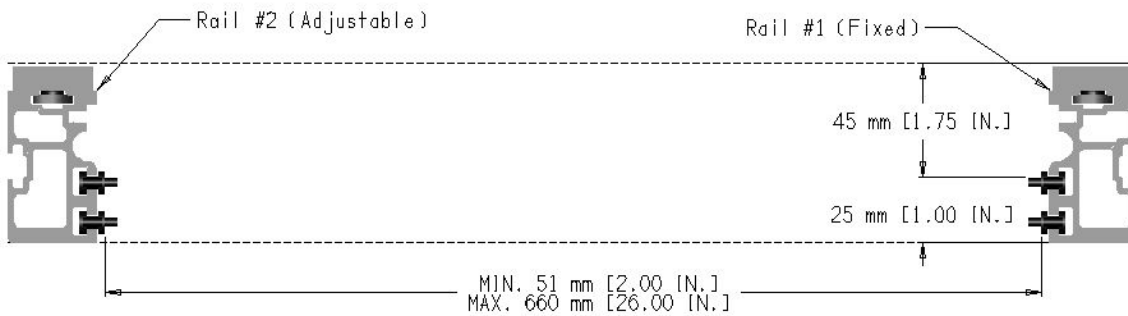
18" ES+ Dual Track Pin Chain Conveyor
(Rails #1&4 Fixed, Rails #2&3 Adjustable)



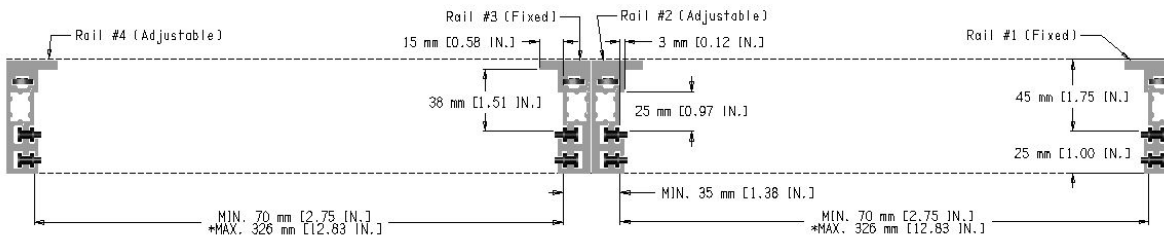
*These are the maximum settings. If specified, rails #1&4 can be set to reduced maximum widths. Rails #2&3 are independently adjustable and computer controlled. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 450 mm [17.71 IN.].

26" Process Chamber Options:

Single Lane 26" Pin Chain Conveyor

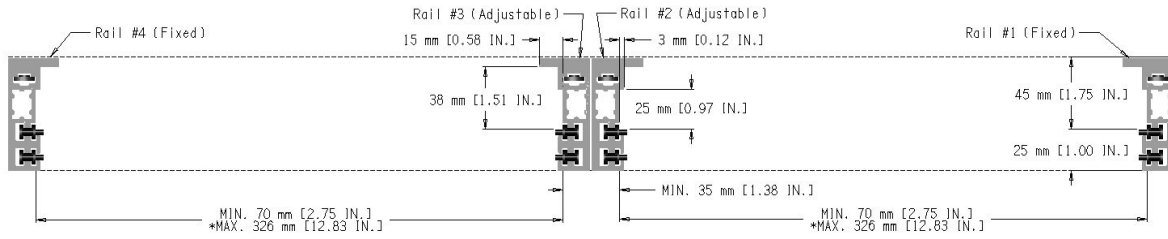


26" Dual Track Pin Chain Conveyor
(Rails #1&3 Fixed, Rails #2&4 Adjustable)



*These are the maximum settings. Rail #3 may be manually positioned to obtain different maximum conveyor widths. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 652 mm [25.67 IN.].

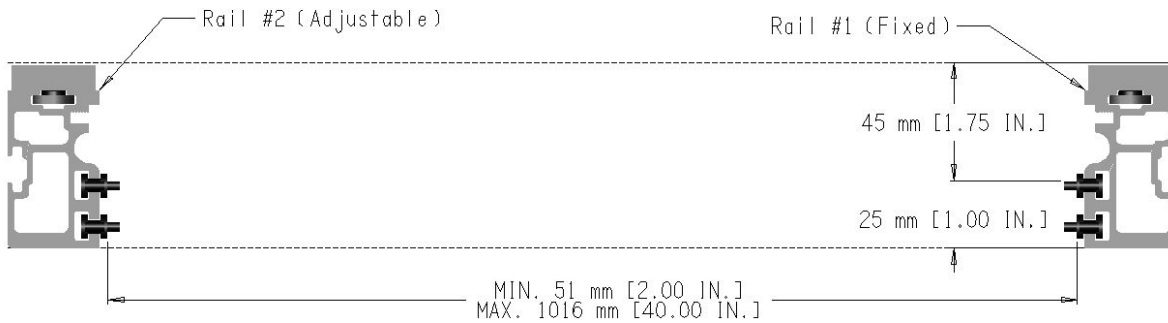
26" Dual Track Pin Chain Conveyor
(Rails #1&4 Fixed, Rails #2&3 Adjustable)



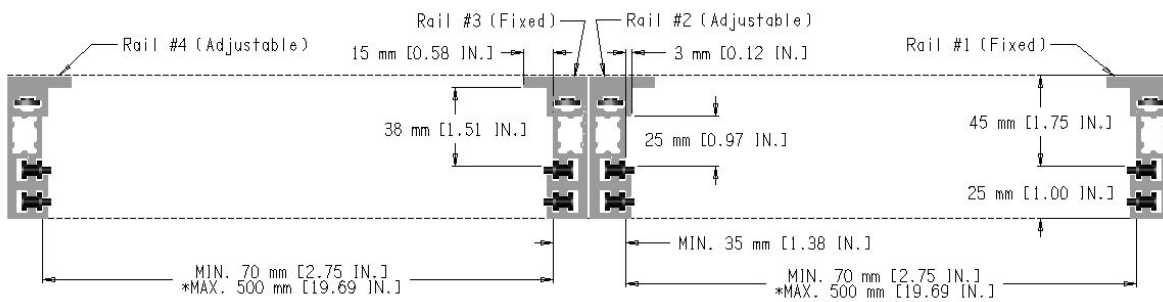
*These are the maximum settings. If specified, rails #1&4 can be set to reduced maximum widths. Rails #2&3 are independently adjustable and computer controlled. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 652 mm [25.67 IN.].

40" Process Chamber Options:

Single Lane 40" Pin Chain Conveyor

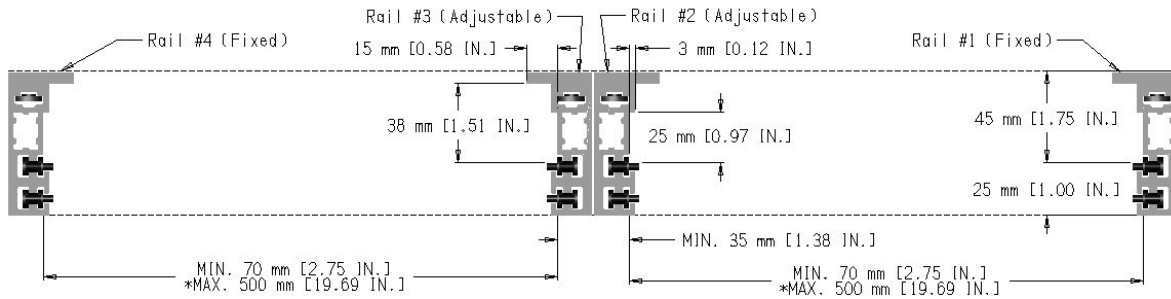


40" Dual Track Pin Chain Conveyor
(Rails #1&3 Fixed, Rails #2&4 Adjustable)



*Rail #3 may be manually positioned to obtain different maximum conveyor widths. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 1000 mm [39.37 IN.].

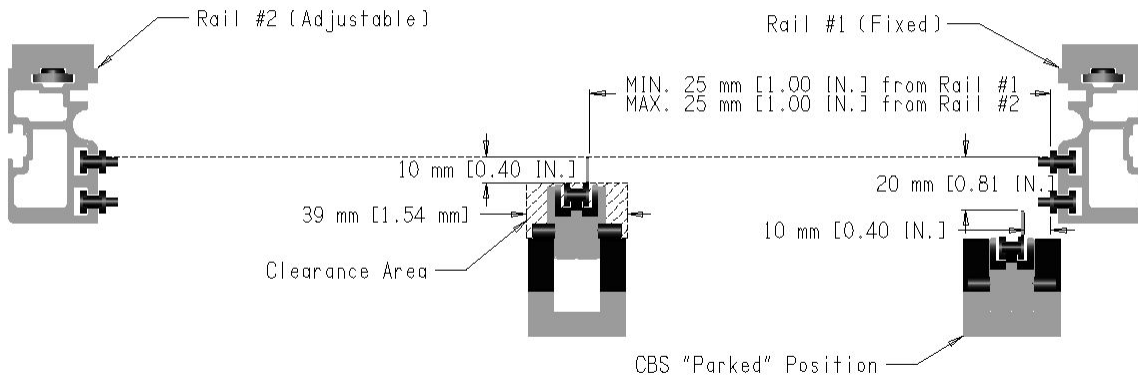
40" Dual Track Pin Chain Conveyor (Rails #1&4 Fixed, Rails #2&3 Adjustable)



*These are the maximum settings. If specified, rails #1&4 can be set to reduced maximum widths. Rails #2&3 are independently adjustable and computer controlled. Maximum combined widths (Lane #1 + Lane #2) cannot exceed 1000 mm [39.37 IN.].

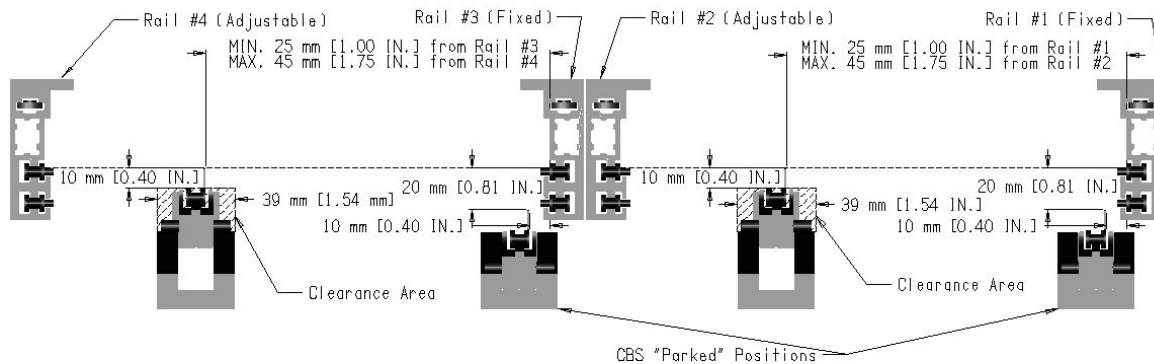
Center Board Support Options:

Single Lane Pin Chain with CBS



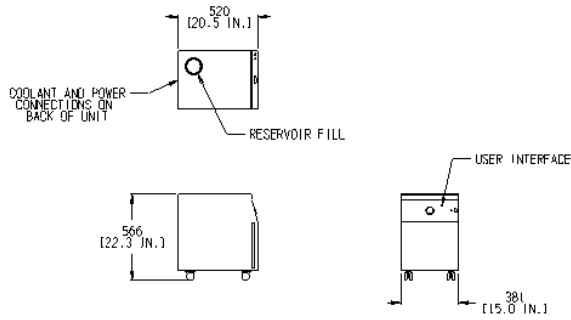
*CBS requires 3 mm [0.12 IN.] clear track on bottom of circuit board.

Dual Track Pin Chain with Dual CBS



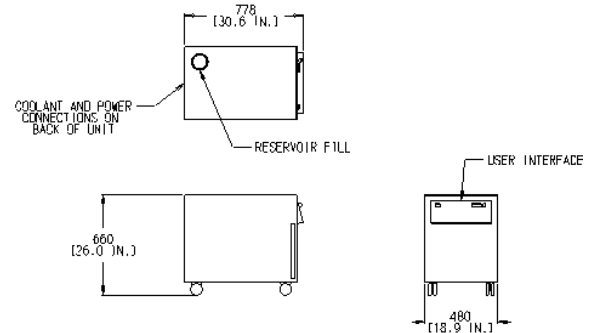
*CBS requires 3 mm [0.12 IN.] clear track on bottom of circuit board.

XIV. INTEGRATED OEM WATER COOLER DRAWINGS



OEM LIQUID-TO-AIR COOLER

NOTE: 1830 mm (72 IN.) OF HOSE AND POWER CORD SUPPLIED TO BE CONNECTED TO MACHINE AT UNLOAD END.



OEM REFRIGERATED CHILLER

NOTE: 1830 mm (72 IN.) OF HOSE AND POWER CORD SUPPLIED TO BE CONNECTED TO MACHINE AT UNLOAD END.