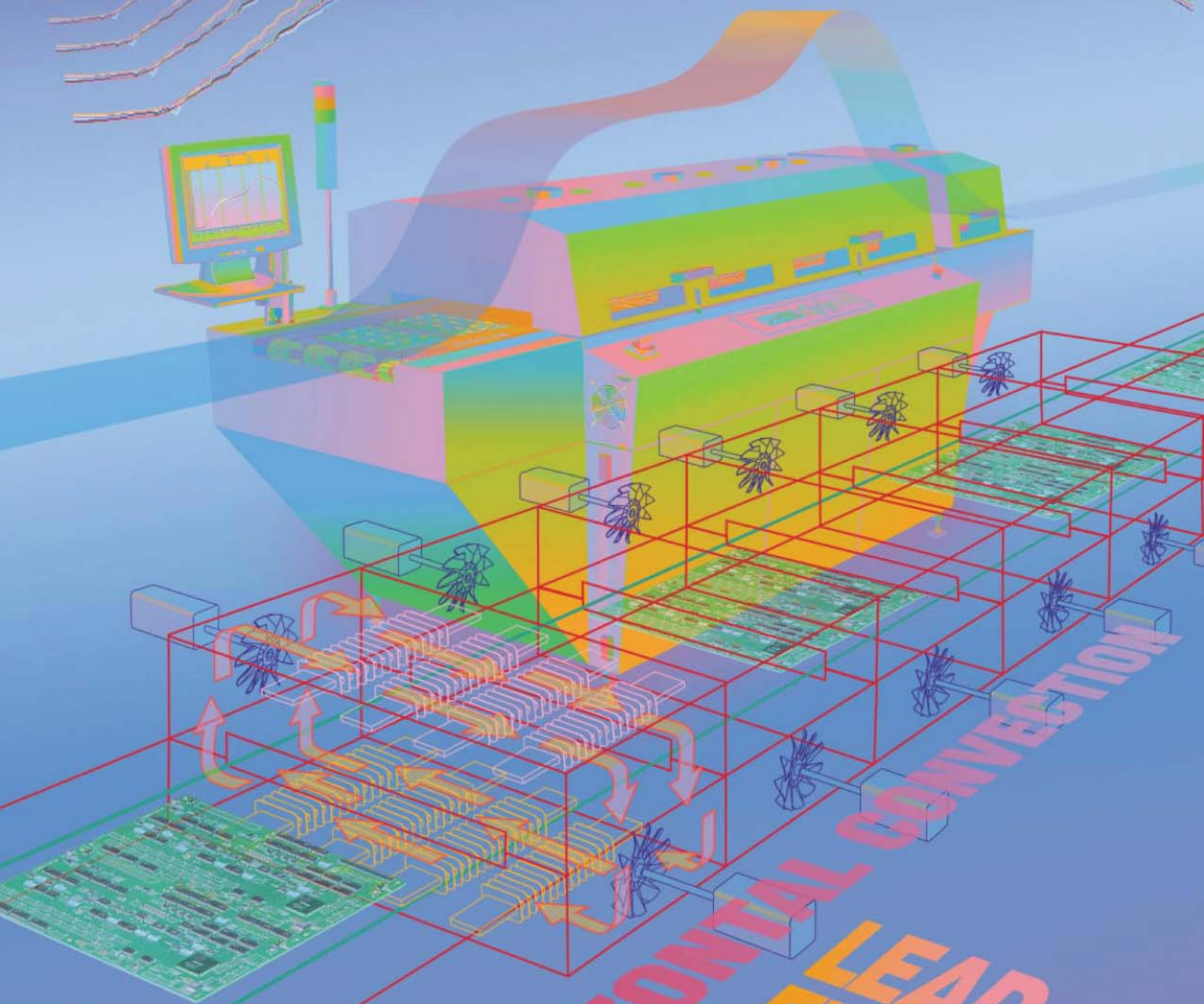




APS Novastar
ADVANCED ASSEMBLY SYSTEMS

REFLOW OVENS



HORIZONTAL CONVECTION
LEAD FREE

SMT REFLOW OVENS with revolutionary Horizontal Convection**

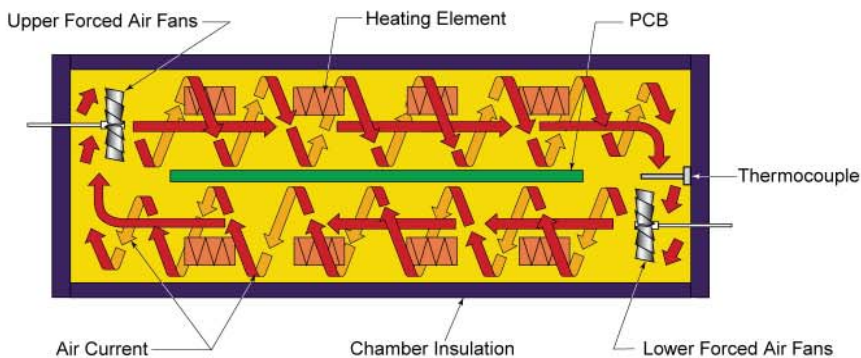


Model GF-120 with 12" wide conveyor and 41" heated tunnel length shown with optional enclosed stand



HORIZONTAL CONVECTION™

Novastar ovens are used for reflowing solder on PC boards, curing, drying and thermal cycling. Our patented** *Horizontal Convection™* system provides the most accurate, most consistent and most repeatable profiles. Air is circulated horizontally in one direction above the board, and in the opposite direction below the board. This circular air current or "cyclone" provides better thermal penetration across the board and yields better results with tough-to-solder components such as BGAs and J-leaded quad flat packs.



Cross-section of chamber (end view)

CURING APPLICATIONS

All models are available with conveyor motor gear reduction, or speed increase, for your curing requirements. Special tunnel heights are available with all models.

*With high temperature option **Machines covered under patent 6,936,793

STANDARD FEATURES IN ALL MODELS

- Computer controller with:
 - 100 menu profile storage
 - 7 day timer
 - Real time temperature profiler with graphic display
 - SPC fault monitoring & reporting
 - English or metric units
 - Battery memory backup
 - Password protection
- Horizontal Convection™ technology**
- Cool-down Station
- Low mass stainless steel conveyor
- Stainless steel chambers
- Viewing windows with lights provide full visibility of entire process
- Full access for quick maintenance and easy cleaning
- Unsurpassed Novastar performance, service and support

Model GF-120

- 3 vertical heating zones plus cooling zone
- Low mass 12" wide stainless steel conveyor
- Easy lift clamshell design

SMT REFLOW OVENS FOR LEAD FREE* REFLOW, CURING AND THERMAL CYCLING



Model 1800 with 18" wide conveyor and 50" heated tunnel length, shown with edge conveyor and PC interface options

Model 2000 with 20" wide conveyor and 72" heated tunnel length shown with PC interface option

Model 1800

- 4 vertical heating zones plus cooling zone
- Low mass 18" wide stainless steel conveyor
- Easy lift clamshell design with gas strut assist
- Status light tower

Model 2000

- 6 vertical heating zones plus cooling zone
- Low mass 20" wide stainless steel conveyor
- Easy lift clamshell design with gas strut assist
- Status light tower

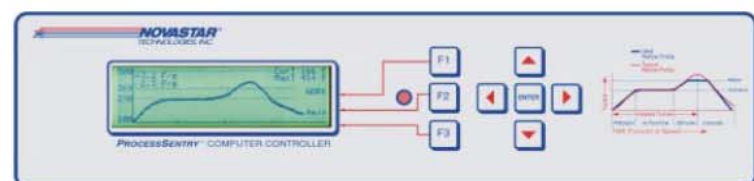
OPTIONS

- High Temp to 400° C (752° F) for lead free solder
- Status light tower for Model GF-120, (standard on 1800, 18X2, 2000 and 20X2)
- Edge rail conveyor (Models 1800, 18X2, 2000 and 20X2 only)
- Nitrogen inerting
- PC interface/windows™ software
- Enclosed stand (GF-120 only)
- Enhanced printing option
- PAK profiling accessory kit
- Custom (curing, drying) applications

ProcessSentry™ COMPUTER CONTROL

The ProcessSentry™ microprocessor control is the brain of Novastar ovens. All parameters are set and displayed in real time.

The ProcessSentry™ is sophisticated yet clear and straightforward. Programming is intuitive and operation is truly user-friendly. The system provides unrivaled accuracy and repeatability while assuring safety and reliability.



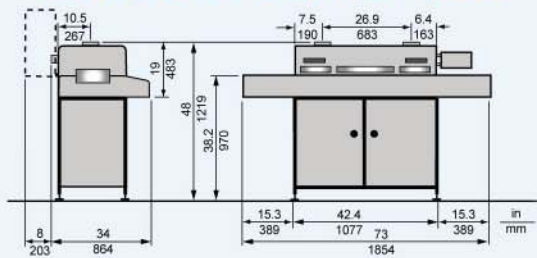
ProcessSentry™ display showing the real-time temperature profile as PC board travels through the oven.



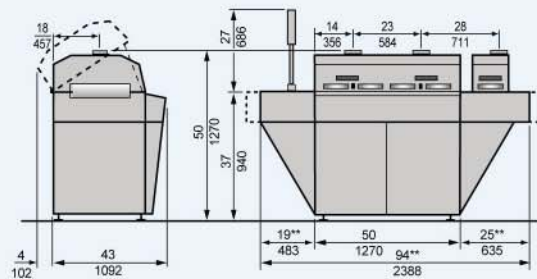
Model GF-120

From our compact benchtop models to our high volume production models, NOVASTAR offers a complete range of ovens for reflow or curing applications. All of our ovens offer Novastar quality and technology: Full featured computer control, ultra controllable profiling capabilities, Horizontal Convection™*, and many other features.

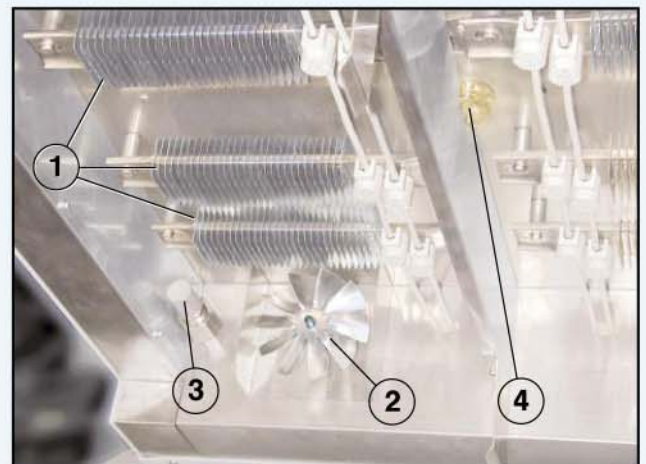
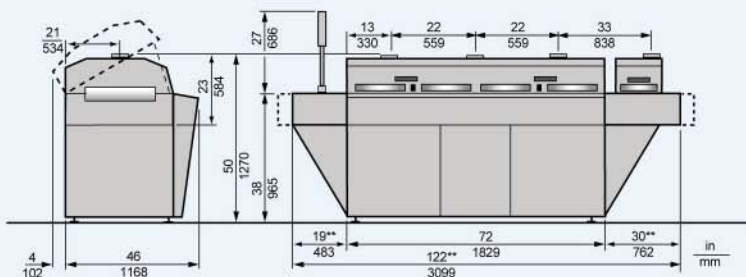
Models GF-120HC & HT



Models 1800HC & HT



Models 2000HC & HT



Upper heating zone showing heating elements (1), upper forced turbine (2), inert gas suffuser (3), and interior lighting (4).



Nitrogen Inverting

Novastar's isolated chamber design (recirculation of atmosphere within each chamber) maintains low oxygen levels while conserving nitrogen.

*Machines covered under patent 6,936,793
**Add 4 inches to each end for edge conveyor

REFLOW OVEN * SPECIFICATIONS

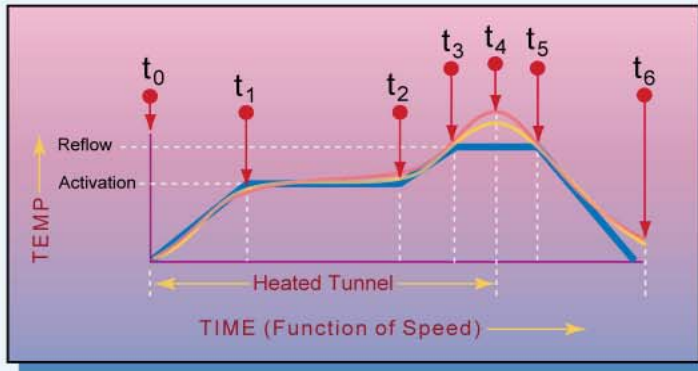
MACHINE SPECIFICATIONS	Models GF-120HC GF-120HT	Models 1800HC 1800HT	Models 2000HC 2000HT
Emitter Technology	Horizontal Convection™	Horizontal Convection™	Horizontal Convection™
Heat Tunnel Length	41" (1042mm)	50" (1270mm)	72" (1829mm)
Standard Heating Zones	3 Top, 3 Bottom	4 Top, 4 Bottom	6 Top, 6 Bottom
Cooling Fans	2	2	4
Electrical Power***	220 VAC, 50/60 Hz 1Ø, 50A	220 VAC, 50/60 Hz 3Ø, 70A	220 VAC, 50/60 Hz 3Ø, 100A
Peak Power	8.7 kW	23.2 kW	34.8 kW
Maximum Temperature	HC: 250° C (484° F) HT: 400° C (752° F)	HC: 250° C (484° F) HT: 400° C (752° F)	HC: 250° C (484° F) HT: 400° C (752° F)
Maximum Board Width	12" (300mm)	18" (457mm)	20" (508mm)
Maximum Board Height†	1.375" (35mm)†	1.375" (35mm)†	1.375" (35mm)†
Height of Conveyor	37.5" ± 1/2" (940mm)	37.5" ± 1/2" (940mm)	37.5" ± 1/2" (940mm)
Venting Requirements	Two 4" (102mm) Dia. Flanges 200 CFM (340m³/h) each	Two 4" (102mm) Dia. Flanges 250 CFM (425m³/h) each	Three 4" (102mm) Dia. Flanges 200 CFM (340m³/h) each
Cooling Zone Venting	NA	4" Dia. Flange, 0-400 CFM (680m³/h)	4" Dia. Flange, 0-400 CFM (680m³/h)
Approx. Shipping Weight	HC: 580 lbs (263 kg) HT: 600 lbs (272 kg)	HC: 1020 lbs (463 kg) HT: 1050 lbs (476 kg)	HC: 1600 lbs (726 kg) HT: 1650 lbs (748 kg)

*All Novastar reflow ovens are covered under patent 6,936,793

**Add 4 inches to each end for edge conveyor

***Other electrical configurations available

†Up to 4" (102 mm) special application tunnel height



- Theoretical Reflow Profile
 - Typical Profile for Model 1200 (3 Vertical Heating Zones)
 - Typical Reflow Profile for Model 2000 (7 Vertical Heating Zones)
- t₀-t₁ PREHEAT
t₁-t₂ ACTIVATION
t₂-t₃ RAMP
t₃-t₄ REFLOW
t₄-t₆ COOLING
t₃-t₅ LIQUIDOUS