



# SMT & AREA ARRAY REWORK

LEAD FREE COMPLIANT AND COMPATIBLE



SOLUTIONS FOR THE ELECTRONICS INTERCONNECTION PROCESS



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With over 50 years of experience and industry leadership in rework and repair technology and techniques, PACE provides much more than simply equipment. When you purchase PACE products, you receive access to one of the most valuable resources in the industry; PACE's applications and technical support services. Over the years, our applications support services have been the cornerstone of quality assurance and repair reliability for countless customers. Whenever you encounter a new component, a new PCB, Lead Free Solder, or if you just want reassurance that your process is safe and effective, simply contact PACE and we will create a procedure for you that not only identifies the equipment required to do the job correctly, but also every step in the process!

PACE's ThermoFlo (TF 1700 & TF 2700) and IR (IR 3000) rework systems are the next generation in automated, cost effective solutions for area array package and SMD rework. No other systems on the market have the advanced features found on these systems or are easier to use, ensuring operator acceptance and success! Designed for today's PCBs, ThermoFlo & IR Rework Systems can safely install and remove a wide variety of CSPs, FCs, PBGAs, CBGAs, MLFs, LCCs, and other SMDs. The PC based software is so advanced that creating profiles has never been easier! The PC software guides the operator through an intuitive interface that virtually automates the process.

All operations: component pickup, alignment, placement, and reflow are completed in a single axis, eliminating the risk of component movement after placement. The software has been specifically designed with the rework process in mind and integrates the inspection process and record keeping as well as the ability to generate reports in user friendly PDF files.



TF 1700

CONVECTIVE HEATING

ThermoFlo systems are fitted with a custom designed 1200 watt top-side heater and an incredibly efficient IR bottom-side heating platform that is adjustable when more power is required for challenging applications. They combine convective top-side heating with remarkably stable and powerful IR bottom-side heating for the most effective, repeatable heating process available today. The bottom-side heater(s) can be adjusted from its standard position up to 38mm (1.5") closer to the PCB for those challenging applications where additional heat is desired or needed! This is a unique PACE feature designed especially for use with Lead Free processes.

The IR 3000 features medium/long wavelength heaters that respond faster with more power than any ceramic or carbon IR emitter currently available. The bottom heater features high power, quick response quartz IR emitters, and share the adjustability feature of the ThermoFlo units. Each process is controlled in real time using a specialized IR sensor

The PCB holder for all 3 units features fine micrometer adjustment for the most delicate X and Y axis alignments. Precise and accurate, within 25 µm (.001"), Z axis movement is ensured through a twin rail, linear bearing motion control assembly that is similar to those used on automated pick and place equipment. The optical alignment system utilizes advanced digital, color cameras and the highest quality prism available for amazing image clarity. All systems are self-contained and do not require an external air supply or vacuum connections. Upgrade your area array rework capabilities and through-put with ThermoFlo or PACE's new IR system!!



TF 2700



## THE IR 3000 FROM PACE

IDEAL FOR POST ASSEMBLY REWORK, REPAIR AND LOW VOLUME PRODUCTION OPERATIONS



## THE ONLY PRODUCTS YOU'LL EVER NEED

FLEXIBILITY AND HIGH PERFORMANCE TO MEET ALL YOUR REWORK REQUIREMENTS

### IR HEATING

The IR 3000 is the newest and most advanced component rework system available on the market. The IR 3000 is fully Area Array capable and can also remove or install most other SMT (and thru-hole components). Featuring a (patented) aperture system to control and precisely apply the heat to protect adjacent components. The IR 3000 features a 500 W long wave top heater and a 1000 W long wave bottom heater. The standard PC software is the most advanced available on any rework system. Custom developed PID algorithms control the heating to your exacting specifications and make profiling easier than ever! Using a high quality, specially developed IR thermal sensor, the process is completely controlled using non contact measuring methods. For added verification, the SODR-CAM is available to watch the entire reflow process happen in real time.

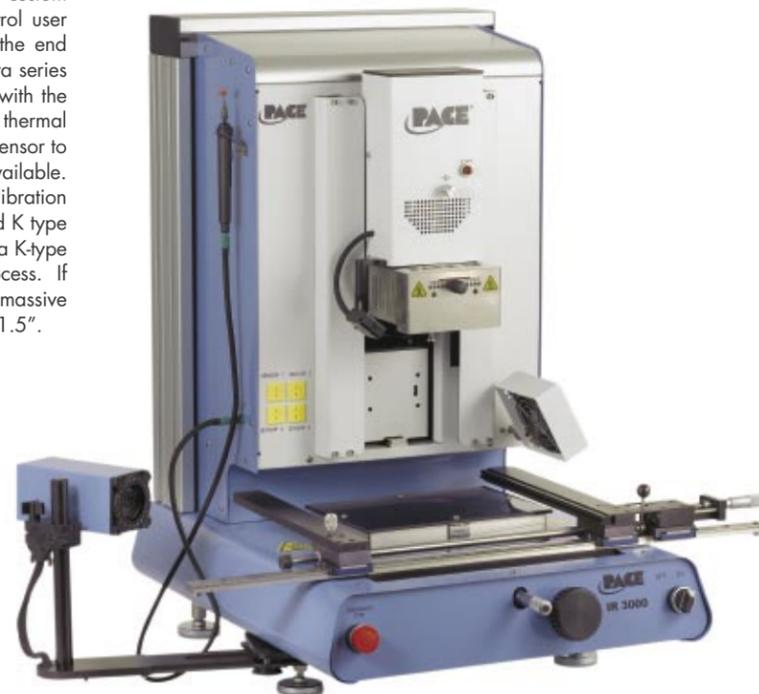
The process begins by loading your component into an adjustable nest which is then picked up using a vacuum pick. The part is lifted to the proper height above the optics and is now ready to be aligned to the PCB. Theta, X and Y adjustments are available to align the components. Precision micrometers are employed for adjusting the alignment in the X and Y directions. The system comes with four different size vacuum picks to handle a wide range of components. If flux dipping is needed, the part can be automatically dipped in flux prior to being aligned.

The optical alignment system within the IR 3000 features a high resolution, color digital camera with PC controlled zoom, focus, auto-focus, and lighting control. The system is robust and does not require routine calibration or maintenance. Standard and full screen viewing options are available as part of the software. The optics extend and retract from the system automatically. High power ultra-white LEDs are used to provide lighting to the component and PCB below while eliminating shadows and distortion. The vacuum pick can be set for each component so that when properly adjusted, the component is placed with almost zero force.

Once the component is placed, the heating process begins. The system is unique in that it uses PACE Exclusive, custom developed, software based, PID controllers to control user determined ramp rates by selecting the time and the end temperature for each phase. Up to 3 additional data series plus the control sensor input can be stored with the profile or can be exported to a CSV file. The IR thermal sensor has a laser built in for easy alignment of the sensor to the part! The IR sensor is one of the most accurate available. If additional accuracy or verification is desired, a calibration method can be employed. As an option, a standard K type thermocouple input can be used in conjunction with a K-type thermocouple mounted to the PCB to control the process. If additional bottom side heat is needed for thermally massive or large PCBs, the bottom heater is adjustable up to 1.5".



IR 3000



### COMPONENT PICK-UP

- Each component is placed into an adjustable nest.
- The nest is placed into position above the optics assembly.
- The reflow head automatically picks up the component and moves it to the proper focal position for alignment.
- High-flow vacuum pump holds component securely.
- Four component pick-up nozzles are available.
- Flux dipping and/or stenciling can be incorporated into the component pick-up procedure.

### COMPONENT ALIGNMENT/PLACEMENT

- High resolution Vision Overlay System (VOS) with Sony color camera and dichroic prism.
- VOS does not require routine calibration, eliminating costly errors and operator frustration.
- Images are viewed through the PC in standard or full screen viewing modes.
- 72 X magnification, color camera with auto-focus and manual capability.
- The automatically controlled, retractable optics housing protects VOS from dirt and contamination.
- Independent lighting controls for component and PCB to maximize overlay contrast.
- Ultra white, high power LED based lighting for PCB and component eliminates shadow and has wide dispersion angles to adequately illuminate large components.
- Precision Z axis movement ensures placement accuracy.
- Component is placed on PCB with minimal controlled pressure.

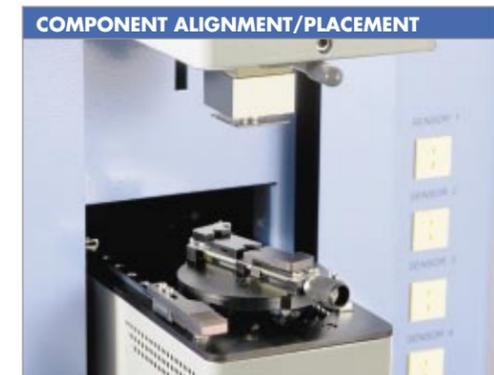
### COMPONENT REFLOW

- Easy programmability ensures process control and successful installation!
- Profiles are created and managed through the PC software.
- Creating the perfect 4 or 5 zone profile is easy with real time adjustment of profile parameters through the PC.
- Store and recall an infinite number of profiles using the PC.
- 2 pre-defined profiles for use as baselines when developing profiles are included.
- Both TF systems feature a 1200 Watt top-heater. With closed loop temperature control and unique vented nozzle design (TF systems only); uniform temperature distribution during reflow is ensured!
- Fully integrated, powerful IR bottom heater(s) with closed loop temperature control ensures process integrity by delivering heat evenly, time after time.
- High power heaters allow for successful, safe and repeatable
- Reflow at safe, low temperatures.
- 4 thermocouple sensor inputs ensure accurate profile development and monitoring.
- The TF systems are N2 capable as standard.

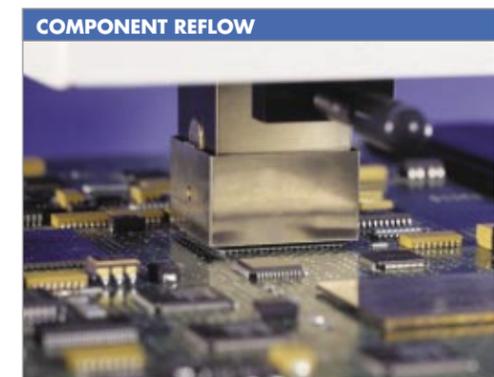
The above feature on both TF & IR Systems.



Nested PBGA about to be picked up by Vacuum pik



PBGA being held by Vacuum pik during Alignment procedure



Nozzle lowering over PBGA for reflow



# AREA ARRAY REWORK SOLUTIONS SOFTWARE

THE PC BASED SOFTWARE IS SO ADVANCED THAT CREATING PROFILES HAS NEVER BEEN EASIER!

# AREA ARRAY REWORK SYSTEM SPECIFICATIONS

TF 1700, TF 2700 AND IR 3000 SPECIFICATIONS

## TF 1700 & TF 2700 Profile Development Screen

- Click and Drag Modification feature allows profiles to be developed and modified in real time using PC mouse.
- Add second soak zone to profile.
- On-demand display of time, temperature and airflow on graph with mouse click.
- Choose between installation or removal modes.
- Individual top-heater set temperature, bottom-heater set temperature, time, and airflow settings for all zones.
- Full system control functions.
- Graphical interface of time, temperature and airflow parameters with upper and lower temperature limit guides.
- 4 thermocouple sensor inputs for profile development/monitoring.
- Incorporate work instructions into profiles.
- Save thermal profile data for import into spreadsheet software (i. e. Excel - not included).
- Verify and compare profiles using "Trial Run Log".
- Activation of external cooling fan to cool PCB and component to below solder melt temperatures.
- Reference image can be stored with profile for easy component identification.



## Production Screen - All Systems

- Password lockout ensures process control by restricting operator access to profile parameters.
- Allows for process validation using up to two thermocouple inputs.
- Document operations for quality assurance.
- Record PCB/component serial numbers for job tracking.
- Operators can record comments and observations.
- Full system control functions.
- Print function allows for follow up documentation and component profile verification.



## Inspection Screen - All Systems

- View, save, and manage images from internal vision system and up to two other inspection sources (NTSC).
- Integrated rework function with inspection function.
- Reference library for immediate operator feedback
- Create inspection reports in PDF format
- Verify process results immediately
- Compatible with XR 3000 and other NTSC video inspection systems



## IR 3000 Profile Development Screen

- Click and Drag Modification feature allows profiles to be developed and modified in real time using PC mouse.
- Add second soak zone to profile.
- Software automatically calculates and controls to the ramp rate you set in Soak and Reflow Zones!
- Separate "Dwell" time for each zone to allow for complete uniformity of temperature and stabilization before proceeding with the next heating phase.
- View reflow in real time using "Sodr-Cam" video camera!
- On-demand display of time, temperature and airflow on graph with mouse click.
- Choose between installation or removal modes.
- Individual top-heater set temperature, bottom-heater set temperature, and time for all zones.
- Full system control functions.
- Graphical interface of time, temperature parameters with upper and lower temperature limit guides.
- 4 thermocouple sensor inputs for profile development/monitoring.
- Incorporate work instructions into profiles.
- Save thermal profile data for import into spreadsheet software (i. e. Excel - not included).
- Verify and compare profiles using "Trial Run Log".
- Activation of external cooling fan to cool PCB and component to below solder melt temperatures.
- Reference image can be stored with profile for easy component identification.

## Alignment Screen - All Systems

- View images from Vision Overlay System.
- Control zoom and focus.
- Auto focus On/Off.
- Store and manage images electronically.
- Full screen viewing mode.
- Reference image can be stored with profile for easy component identification.



## Set Up Screen - All Systems (unless noted)

- Active password lockout on Profile Development Screen.
- Set upper and lower temperature parameters for graphical interface.
- View software in choice of multiple languages.
- SetBack mode and AutoOff function.
- Access diagnostic tools and trouble-shooting logs
- Turn on/off laser site for IR Sensor (IR 3000 only)



SPECIFICATIONS	TF 1700	TF 2700	IR 3000
Part Numbers	8007-0465 120 VAC Unit 8007-0466 230 VAC Unit	8007-0467 120 VAC System 8007-0469 230 VAC System	8007-0534 120 VAC 8007-0535 230 VAC
Heater (top side)*	Convective (air or N <sub>2</sub> ), 1200 Watts	Convective (air or N <sub>2</sub> ), 1200 Watts	Medium/Long wave IR, 500 W
Bottom Heater*	IR, 400 Watts x 1	IR 1300 W total (400 Watts x 1 & 150 W x 6)	Medium/Long wave IR 1000 W
with adjustable working height	220mm x 155mm (8.6" x 6.1")	405mm x 405mm (16" x 16")	220 x 155mm (8.6" x 6.1")
Max Component size	65mm x 65mm (2.5" x 2.5")		
Max PCB size	305mm x 305mm (12" x 12")	610mm x 610mm (24" x 24")	305mm x 305mm (12" x 12")
Airflow maximum	Self contained, manual adjust, 20 SLPM	Self contained, PC controlled, adjust up to 20 SLPM	N/A
N <sub>2</sub> Option	Standard		N/A
Resolution on Optics Adjustment	0.52mm (0.02") per rotation		
Positioning Accuracy (Z axis)	± 25 μmeters (0.001")		
Vacuum	450 mm Hg		
Power Requirements	120 VAC, 60 Hz or 230 VAC, 50 Hz (2000 watts maximum)	120 VAC, 60 Hz or 230 VAC, 50 Hz (2800 watts maximum)	120 VAC, 60 Hz or 230 VAC, 50 Hz (2000 watts maximum)
Optics	High resolution, Vision Overlay System		High resolution, Vision Overlay System with Color Camera
Video Inputs	2 Composite Video, 1 "S" Video (for alignment optics)		2 Composite (B/C) and 1 "S" Video (for alignment optics)
Temperature setting range	Top Heater: 100° to 400° C (212° - 750° F) Bottom Heater: 100° to 221° C (212° - 430° F)		
Dimensions	737mm H x 686mm W x 737mm D (29" H x 27" W x 29" D)	815mm H x 737mm W x 790mm D (32" H x 29" W x 31" D) <small>(PCB holder rails increase width to 1140mm (45"))</small>	737mm H x 686mm W x 737mm D (29" H x 27" W x 29" D)
Weight (Without Computer)	45kg (100lbs)	91kg (200lbs)	37kg (82lbs)
Video Monitor Viewable Area	482mm (19") Wide Screen LCD Flat Panel Monitor	482mm (19") Wide Screen LCD Flat Panel Monitor	482mm (19") Wide Screen LCD Flat Panel Monitor
Board Supports	Included		
Optical Alignment Kit	Included		

\*Heater function continuously monitored by PC closed loop control



# THERMOFLO NOZZLE CHART

THESE NOZZLES ARE FOR USE WITH TF 1700 & TF 2700. CUSTOM NOZZLES ARE ALSO AVAILABLE

# XR 3000 BGA/CSP INSPECTION SYSTEM

REAL-TIME X-RAY GIVES IMMEDIATE FEEDBACK

MAXIMUM COMPONENT SIZE	NOZZLE DIMENSIONS	NOZZLE P/N
6mm x 8mm (0.24" x 0.31")	9mm x 11mm (0.35" x 0.43")	4038-7002
7.3mm x 7mm (0.29" x 0.28")	10.3mm x 10mm (0.40" x 0.40")	4038-7040
8.1mm x 8.1mm (0.31" x 0.31")	11.1mm x 11.1mm (0.43" x 0.43")	4038-7055
8.2mm x 12.7mm (0.32" x 0.50")	11.2mm x 15.7mm (0.44" x 0.62")	4038-7003
9mm x 9mm (0.35" x 0.35")	12mm x 12mm (0.47" x 0.47")	4038-7004
10mm x 10mm (0.39" x 0.39")	13mm x 13mm (0.51" x 0.51")	4038-7005
11.4mm x 5.1mm (0.49" x 0.20")	14.4mm x 8.1mm (0.56" x 0.31")	4038-7050
13mm x 10mm (0.51" x 0.40")	16mm x 13mm (0.63" x 0.51")	4038-7039
13mm x 13mm (0.51" x 0.51")	16mm x 16mm (0.63" x 0.63")	4038-7006
14mm x 22mm (0.55" x 0.87")	17mm x 25mm (0.67" x 0.99")	4038-7021
15mm x 15mm (0.59" x 0.59")	18mm x 18mm (0.71" x 0.71")	4038-7007
15.34mm x 12.7mm (0.60" x 0.50")	18.34mm x 15.7mm (0.72" x 0.61")	4038-7063
15.6mm x 5.1mm (0.61" x 0.20")	18.6mm x 8.1mm (0.73" x 0.31")	4038-7062
16.5mm x 8mm (0.65" x 0.31")	19.5mm x 11mm (0.77" x 0.43")	4038-7027
17mm x 11mm (0.67" x 0.43")	20mm x 14mm (0.79" x 0.55")	4038-7052
17mm x 17mm (0.67" x 0.67")	20mm x 20mm (0.79" x 0.79")	4038-7008
19mm x 19mm (0.75" x 0.75")	22mm x 22mm (0.87" x 0.87")	4038-7026
20mm x 8mm (0.79" x 0.31")	23mm x 11mm (0.90" x 0.43")	4038-7058
20mm x 20mm (0.79" x 0.79")	23mm x 23mm (0.90" x 0.90")	4038-7061
21mm x 12.75mm (0.83" x 0.50")	24mm x 15.75mm (0.94" x 0.62")	4038-7060
21mm x 25mm (0.83" x 0.98")	23mm x 28mm (0.91" x 1.1")	4038-7029
22mm x 22mm (0.86" x 0.86")	25mm x 25mm (0.98" x 0.98")	4038-7057
23mm x 23mm (0.90" x 0.90")	26mm x 26mm (1.02" x 1.02")	4038-7009
25mm x 25mm (0.98" x 0.98")	28mm x 28mm (1.1" x 1.1")	4038-7025
27mm x 27mm (1.06" x 1.06")	30mm x 30mm (1.18" x 1.18")	4038-7010
28mm x 16mm (1.1" x 0.63")	31mm x 19mm (1.22" x 0.75")	4038-7038
28mm x 28mm (1.1" x 1.1")	31mm x 31mm (1.22" x 1.22")	4038-7048
28.5mm x 17mm (1.12" x 0.67")	31.5mm x 20mm (1.22" x 0.79")	4038-7059
29mm x 29mm (1.14" x 1.14")	32mm x 32mm (1.26" x 1.26")	4038-7030
30mm x 30mm (1.18" x 1.18")	33mm x 33mm (1.3" x 1.3")	4038-7044
31mm x 31mm (1.22" x 1.22")	33mm x 33mm (1.3" x 1.3")	4038-7031
32mm x 17mm (1.26" x 0.67")	35mm x 20mm (1.37" x 0.79")	4038-7053

MAXIMUM COMPONENT SIZE	NOZZLE DIMENSIONS	NOZZLE P/N
32.5mm x 23mm (1.28" x 0.90")	35.5mm x 26mm (1.40" x 1.02")	4038-7051
7.3mm x 7mm (0.29" x 0.28")	35.5mm x 28mm (1.40" x 1.1")	4038-7056
33mm x 33mm (1.29" x 1.29")	36mm x 36mm (1.42" x 1.42")	4038-7028
35mm x 35mm (1.37" x 1.37")	38mm x 38mm (1.5" x 1.5")	4038-7011
38.1mm x 25.8mm (1.50" x 1.01")	41.1mm x 28.8mm (1.61" x 1.13")	4038-7066
40mm x 40mm (1.57" x 1.57")	43mm x 43mm (1.7" x 1.7")	4038-7024
41mm x 41mm (1.61" x 1.61")	43mm x 43mm (1.7" x 1.7")	4038-7047
42mm x 42mm (1.65" x 1.65")	45mm x 45mm (1.77" x 1.77")	4038-7032
42.5mm x 32.5mm (1.67" x 1.40")	45.5mm x 35.5mm (1.80" x 1.39")	4038-7054
43mm x 43mm (1.7" x 1.7")	46mm x 46mm (1.81" x 1.81")	4038-7045
44mm x 33mm (1.73" x 1.29")	47mm x 36mm (1.85" x 1.41")	4038-7064
44mm x 44mm (1.73" x 1.73")	47mm x 47mm (1.85" x 1.85")	4038-7043
44.5mm x 44.5mm (1.75" x 1.75")	47.5mm x 47.5mm (1.87" x 1.87")	4038-7012
46mm x 46mm (1.81" x 1.81")	49mm x 49mm (1.93" x 1.93")	4038-7046
48mm x 48mm (1.89" x 1.89")	51mm x 51mm (2" x 2")	4038-7049
50mm x 50mm (1.97" x 1.97")	53mm x 53mm (2.1" x 2.1")	4038-7022
56mm x 17mm (2.2" x 0.67")	59mm x 20mm (2.32" x 0.79")	4038-7037
60mm x 60mm (2.36" x 2.36")	63mm x 63mm (2.5" x 2.5")	4038-7023
Connector, 16mm x 13mm (0.63" x 0.51")	19mm x 16mm (0.75" x 0.63")	4038-7033
Connector, 19mm x 8mm (0.75" x 0.31")	22mm x 11mm (0.87" x 0.43")	4038-7036
Connector 27mm x 13mm (1.06" x 0.51")	30mm x 16mm (1.18" x 0.63")	4038-7034
Connector, 30mm x 12mm (1.18" x 0.47")	33mm x 15mm (1.3" x 0.59")	4038-7035
LQFP 9mm x 9mm (0.35" x 0.35")	12mm x 12mm (0.47" x 0.47")	4038-7016
LQFP 12mm x 12mm (0.47" x 0.47")	15mm x 15mm (0.59" x 0.59")	4038-7017
LQFP 14mm x 14mm (0.55" x 0.55")	17mm x 17mm (0.67" x 0.67")	4038-7020
LQFP 16mm x 16mm (0.63" x 0.63")	19mm x 19mm (0.75" x 0.75")	4038-7014
LQFP 16mm x 22mm (0.63" x 0.87")	19mm x 25mm (0.75" x 0.99")	4038-7019
LQFP 22mm x 22mm (0.87" x 0.87")	25mm x 25mm (0.98" x 0.98")	4038-7013
LQFP 26mm x 26mm (1.02" x 1.02")	29mm x 29mm (1.14" x 1.14")	4038-7018
LQFP 30mm x 30mm (1.18" x 1.18")	33mm x 33mm (1.29" x 1.29")	4038-7015
Micro Nozzle Kit	1mm to 8mm square	6993-0244-P1



The XR 3000 is ideal for inspecting BGAs, CSPs, and other electronic components. The XR 3000 provides immediate feedback on your process using real time images. Images can be viewed through PACE's ThermoFlo or IR software or through an optional, flat screen, LCD monitor (P/N 7015-0010) when used as a stand-alone unit.

The XR 3000 has been designed with rework in mind so it is able to fit easily on the benchtop and can be relocated quickly. Featuring patented camera technology and outstanding zoom capability, the XR 3000 is able to identify a wide range of anomalies, as small as .025mm (.001").

When integrated with TF 1700, TF 2700 or IR 3000 software, the XR 3000 system can actually teach operators how to identify defects using the defect image library. Examples of common defects are included with the software that operators can refer to, to compare the live image of their work with the reference image. The library can be added to and modified so you can provide images of the actual work to the operator for immediate comparison. The images can be viewed, stored electronically, and managed. Defect analysis reports with images can be easily created.



## AREA-ARRAY INTERCONNECTION ANOMALIES IDENTIFIED BY THE XR 3000

BRIDGING	MISSING SOLDER BALLS	SOLDER VOIDS	SOLDER BALLS	COLD SOLDER
Bridging between solder joints is easily identified.	Missing solder balls can be identified easily.	Solder voids	Solder balls in the centre of the package are oversized due to delamination and compression under die area.	Cold solder is signified by a jagged, irregular edge around the perimeter of the solder ball. Note that in this image only some of the balls show this signature.

Please visit [www.paceworldwide.com](http://www.paceworldwide.com) for more information on the wide range of PACE's Nozzles and Component Stenciling.



# XR 3000 BGA/CSP INSPECTION SYSTEM

REAL-TIME X-RAY GIVES IMMEDIATE FEEDBACK



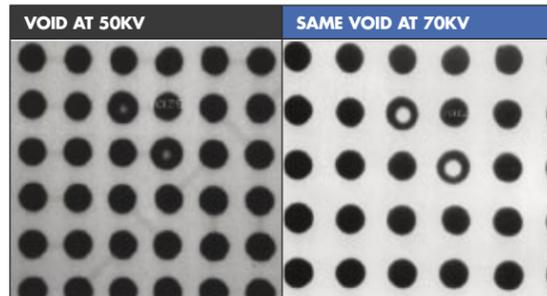
# CONVECTIVE REWORK SYSTEMS

HAND HELD CONVECTIVE SYSTEMS

## AVOID REJECTING GOOD BOARDS, WITH PACE'S PATENTED CAMERA TECHNOLOGY

Voltage blooming is associated with the X-ray camera used in many X-ray inspection systems.

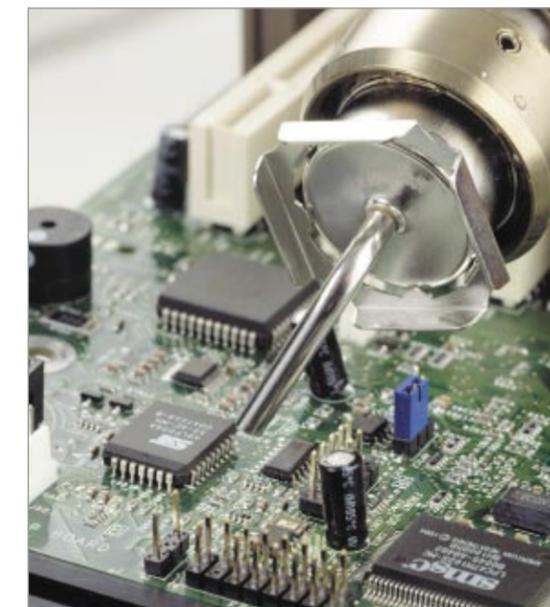
The phenomenon occurs when voltage is increased, causing the white area of the X-ray image (the void) to expand (or bloom) and encroach on the black area. This makes a void appear larger than it really is. A void that occupies 10% of a solder sphere at 50 kV may appear to consume up to 50% of the solder sphere at 70 kV. The patented camera technology found in PACE's XR 3000 is the only system of its type not subject to Voltage Blooming. The camera technology ensures that void sizes remain consistent.



FEATURES / SPECIFICATIONS	XR 3000
Power Requirements	115 VAC, 60 Hz or 230 VAC, 50/60 Hz 1000 Watts max
X-Ray Tube	50 kv
Color Camera	High resolution with 7.40x zoom
Maximum PCB Size	760mm x unlimited (30" x unlimited)
Focal Spot	0.2mm (0.008")
Focal Spot to Image Plane Distance	124mm (4.875")
Adjustments	Live or Capture video signal options. Video Gain adjustment
Contrast Resolution	Can resolve a 0.25mm (0.001") gold wire
Spatial Resolution	20lp/mmv
X-Ray Actuation	Foot Pedal
Opening Clearance	40mm (1.5") 120 VAC, 19mm (0.75") 230 VACv
PCB Fixture Device	Standard
Small PCB Carrier	Standard
Dimensions	394mm H x 457mm W x 585mm D (15.5" H x 18" W x 23" D)
Weight	39Kg (86lbs)
DESCRIPTION	PART NUMBER
XR 3000 120 VAC	8007-0385
XR 3000 230 VAC	8007-0386

Convective systems use Hot Air to reflow solder joints and are often thought of as a "safer" method for removing and installing components from PCBs because of the non-contact process. These systems use a pump to generate airflow that first passes through a heater, where it is warmed to the appropriate temperature, and then through a nozzle that "shapes" the air stream for the specific component. More than 75 different nozzles are available for these systems! Convective systems are ideal for removing Surface Mount Components as they leave little residual solder on the PCB when compared to conductive techniques. They are also appropriate for installing leaded components with solder paste and for installing components without visible leads, such as BGAs, MLFs, LGAs, and LCCs. The ideal system and accessory items depend on the application, component sensitivity, component type and other factors. For high mass applications and for components without visible leads, it is strongly recommended that a preheater and PCB holder be used in conjunction with the convective system to ensure thorough heating and to eliminate PCB damage and warping. PACE is pleased to offer three systems to meet your exacting specifications. Please refer to the table below to assist with system selection.

TYPE	ST 300	ST 325	ST 350
Standard Pitch Component Removal	✓	✓	✓
Fine Pitch Component Removal	✓	✓	✓
Standard Pitch Area Array Component Removal	✓	✓	✓
Fine Pitch Area Array Component Removal	✓	✓	✓
Standard Pitch Component Installation	✓	✓	✓
Fine Pitch Component Installation			✓
Standard Pitch Area Array Component Installation		✓	✓
Fine Pitch Area Array Component Installation			✓



ST 300 Reflowing a PLCC



ST 350 Reflowing a BGA component



# CONVECTIVE SMT SYSTEMS

## LOW COST HOT AIR REFLOW SYSTEMS

The ST 300 can be used to remove any SMD and for installing components that can be positioned manually. The ST 300 is a self-contained system with analog (dial) controls for temperature and airflow. The heavy-duty, durable metal housing ensures years of service and the sloped face of the front panel is a standard feature for ease of use. Other ST systems can be stacked on to the ST 300 to preserve bench space. Both cycle start and vacuum functions are activated with conveniently located switches on the handpiece. The ST 300 features the Quiet-Flo turbine for close to silent operation. Additionally, the system comes with the Lo-Flo pump and the vacuum wand (PV-65) for manipulating components manually. The capabilities of the ST 300 can be greatly enhanced when coupled with the ST 500, ST 525, or ST 550. Optional Nozzle Storage Rack 6019-0072-P1, holds 13 nozzles.

### Features

- Lockable Temperature and Airflow adjustment knobs
- Automatic shut off for safety
- Functional LED Indicator lights on front panel
- Quiet-Flo turbine blower reduces operating noise
- Hi-Flo Vacuum Pump for holding component securely
- Lo-Flo Vacuum Pump for component wand

See page 18-19 for universal stand work holders and preheaters.



ST 300

SPECIFICATIONS	ST 300
Part Numbers	8007-0427 ST 300 8007-0428 ST 300E
Power Requirements	97-127 VAC, 50/60 Hz, 575 Watts max. 197-253 VAC, 50/60 Hz, 575 Watts max.
Dimensions	134mm H x 245mm W x 254mm D (5.25" H x 10" W x 10.4" D)
Weight	4.3Kg (9.5lbs.)
Temperature Control	Closed loop temperature control
Temperature Stability	± 9°C (± 15 °F) at idle tip temp.
Temperature Range	149° to 482°C (300° to 900°F) nominal
Airflow Range	5-22 slpm



# CONVECTIVE SMT SYSTEMS

## DIGITAL PROGRAMMABLE HOT AIR REFLOW SYSTEMS

The ST 325 is a digital, self-contained system that is fully programmable and can be used to remove or install surface mount components when individual or multiple operations are to be run. From the front panel, the system can be used in either manual or "timed" modes. Manual mode means that the system generates heated airflow when the cycle button is pressed; when it is pressed a second time the system shuts off. "Timed" modes allow the operator to create up to 20 "Profiles" that consist of time and temperatures parameters to ensure process control and repeatability. Both cycle start and vacuum functions are activated with conveniently located switches on the handpiece.

The ST 325 comes standard with one K-type thermo-couple input that can be used to monitor the thermal environment at the work site with optional software. The system also comes with the Lo-Flo pump and the vacuum wand (PV-65) for manipulating components manually. The heavy-duty, durable metal housing ensures years of service and the sloped face of the front panel is a standard feature for ease of use. Other ST systems can be stacked on to the ST 325 to preserve bench space. The capabilities of the ST 325 can be used to remove or install just about any type of standard pitch surface mount component when coupled with the ST 500, ST 525, or ST 550.

When additional programming capability is required, such as 4 zone profile creation, an optional software package is available that can be used with a PC or laptop (1199-0019-P1). The optional software package further allows the ST 325 to control the ST 450 Preheater when bottom side heating of the PCB is required. Once the 4 zone profiles have been created with the software, they can be downloaded to the ST 325 and can be run WITHOUT the PC or laptop being connected!

The system can install standard BGA packages when fitted with the ST 500, ST 525 or ST 550, ST 450 or ST 400, and the optional PC or laptop software. Area array components are aligned using a proven, reliable template method that is easy to use.



ST 325 Front Panel



SPECIFICATIONS	ST 325
Part Numbers	8007-0429 ST 325 8007-0432 ST 325E
Power Requirements	97-127 VAC, 50/60 Hz, 575 Watts max. 197-253 VAC, 50/60 Hz, 575 Watts max.
Dimensions	134mm H x 245mm W x 254mm D (5.25" H x 10" W x 10.4" D)
Weight	4.5Kg (9.9lbs.)
Temperature Control	Closed loop, digital temperature control
Temperature Stability	± 9°C (± 15 °F) at idle tip temp.
Temperature Range	149° to 482°C (300° to 900°F) nominal
Airflow Range	5-22 slpm

### Features

- Multi-level password lock-out prevents unauthorized changes
- User definable temperature zone
- Audible countdown timer for end of cycle indication in the Timed and Program modes
- On-screen display of parameters (temperature, time) during operation
- Store and recall up to 20 profiles (40 with optional software)
- Quiet-Flo turbine blower offers nearly silent operation
- Hi-Flo Vacuum Pump for holding component securely
- Lo-Flo Vacuum Pump for component wand

### Patented, Adjustable, Spring Loaded Vacuum Pik

The handpiece is fitted with an adjustable, spring loaded vacuum pik to lift components from the PCB and to hold the component in the nozzle during alignment. The "give" in the spring loading is set, but the absolute position of the vacuum pik is adjustable over a 1.5" length.





# CONVECTIVE SMT SYSTEMS

## ST 350 CONVECTIVE REWORK CENTER

The ST 350 is the ultimate in cost effective, programmable, convective rework equipment. No other system on the market at the same price level can compete! The system is completely self-contained and is capable of installing virtually any type of surface mount component. The system is ideal for service centers, prototyping shops, low volume production or remanufacturing centers that want to purchase a single piece of equipment that can handle just about anything!

The ST 350 has all of the process control built into the unit and boasts digital controls for temperature, time, and airflow. The electronic controls are fully integrated and are simple to use and program to meet your needs, unlike the "off the shelf PID control modules" used on competitive equipment. This means that you can "set it and forget it" instead of being tied to the unit to perform tasks during the process which can be more than 6 minutes long! Your time can be better spent preparing for the next operation than waiting to activate non-integrated control modules.

From the front panel, the system can be used in either manual or "timed" modes. Manual mode means that the system generates airflow when the cycle button is pressed the first time. When pressed a second time, the system shuts off. "Timed" modes allow the operator to set up "Profiles" that consist of time and temperature parameters to ensure process control and repeatability. All of the interface controls for the ST 350 are also located in a remote control box that can be placed on either side of the unit for maximum convenience to the operator.



ST 350

### Features

- Multi-level password lock-out prevents unauthorized changes
- User definable temperature zone
- Audible countdown timer for end of cycle indication in the Timed and Program modes
- Store and recall up to 20 profiles (40 with optional software)
- Quiet-Flo turbine blower offers nearly silent operation
- On-screen display of parameters (temperature, time) during operation
- Integrated PCB holder with micrometer adjustments

# CONVECTIVE SMT SYSTEMS

## ST 350 CONVECTIVE REWORK CENTER



SPECIFICATIONS	ST 350
Part Numbers	8007-0437 ST 350 8007-0438 ST 350E
Power Requirements	97-127 VAC, 50/60 Hz, 575 Watts max. 197-253 VAC, 50/60 Hz, 575 Watts max.
Dimensions	578mm H x 930mm W x 665mm D (22.75" H x 36.75" W x 26.25" D)
Weight	26.4Kg (58lbs.)
Temperature Control	Closed loop, digital temperature control
Temperature Stability	± 9°C (± 15 °F) at idle tip temp.
Temperature Range	149° to 482°C (300° to 900°F) nominal
Airflow Range	5-22 slpm

The reflow head features Theta rotation for alignment, Z axis motion as well as Y axis motion so the reflow head can be moved safely out of the way so it doesn't interfere with the operator's ability to see while the component land site is being dressed, cleaned, or inspected. The standard PCB holder is capable of holding a PCB that is 457mm x 457mm (18" x 18") and has micrometer adjustments in the X and Y directions for easy alignment.

The ST 350 features the Quiet-Flo turbine and has one K-type thermo-couple input that can be used to monitor the thermal environment at the work site with optional software. Additionally, the system comes standard with the Lo-Flo pump and the vacuum wand (PV-65) for manipulating components manually.

When additional programming capability is required, such as 4 zone profile creation for area array components, an optional software package is available that can be used with a PC or laptop (1199-0019-P1). The optional software package further allows the ST 350 to control the ST 450 Preheater when bottom side heating of the PCB is required. Up to three preheaters (any combination of ST 400s and ST 450s) can be placed under the PCB holder. After 4 zone profiles have been created with the optional software, they can be downloaded to the ST 350 and can be run WITHOUT the PC or laptop being connected! Area array components are aligned using a proven, reliable template method that is easy to use.



### FEATURED ITEMS...



Reflow head moves back and out of the way to give you clear PCB access for board prep and clean up.

Fast and repeatable nozzle height adjustment with mechanical stop for consistency of process.

**PACE UNIQUE FEATURE (Twist)**  
Simple coplanarity adjustment allows for exact nozzle adjustment, much better than fixed head systems.

**PACE UNIQUE FEATURE**  
Simple coplanarity adjustment allows for exact nozzle adjustment, much better than fixed head systems.

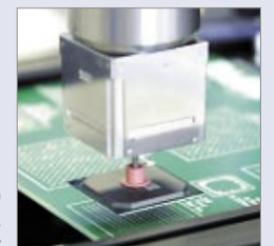
**BGA alignment is easy with PACE's proven template alignment method**



**ST 350 holding QFP component**



**ST 350 holding BGA component**





# CONVECTIVE SYSTEM NOZZLES

THESE NOZZLES ARE FOR USE WITH THE ST 300, ST 325 & ST 350



# CONVECTIVE SYSTEM NOZZLES

CAN'T FIND THE RIGHT NOZZLE FOR YOUR APPLICATION? GIVE US A CALL, WE CAN MAKE CUSTOM NOZZLES

BGA NOZZLES	COMPONENT	BGA SIZE (NOMINAL)	PART NUMBER
	BGA-204/225/256/ 272/292/320/324	27mm x 27mm (1.1" x 1.1")	4028-5001
	BGA-169/168	23mm x 23mm (0.91" x 0.91")	4028-5002
	BGA-313/352	35mm x 35mm (1.38" x 1.38")	4028-5003
	BGA-144	13mm x 13mm (0.51" x 0.51")	4028-5004
	BGA-121/196	15mm x 15mm (0.59" x 0.59")	4028-5005
	BGA-86	16.25mm x 17.75mm (0.64" x 0.70")	4028-5006
	BGA-68	13.45mm x 14.97mm (0.53" x 0.59")	4028-5007
	BGA-32	10.42mm x 10.42mm (0.41" x 0.41")	4028-5008
	BGA-40/44	11.97mm x 13.21mm (0.47" x 0.52")	4028-5009
	BGA-18	8.64mm x 8.90mm (0.34" x 0.35")	4028-5010
	BGA-421/432/736	40mm x 40mm (1.57" x 1.57")	4028-5012
	BGA-560	42.5mm x 42.5mm (1.67" x 1.67")	4028-5013
	BGA-240/304/432	31mm x 31mm (1.22" x 1.22")	4028-5014
	BGA-256	17mm x 17mm (0.67" x 0.67")	4028-5015
	BGA-252/255/256	21mm x 21mm (0.83" x 0.83")	4028-5016
	BGA (Short Adpt.)	21mm x 21mm (0.83" x 0.83")	4028-5017
	BGA-479/493/584	37.5mm x 37.5mm (1.48" x 1.48")	4028-5018
	BGA-96/121	19mm x 19mm (0.75" x 0.75")	4028-5019
	BGA-240/324	32mm x 32mm (1.26" x 1.26")	4028-5020
	BGA-256/400	29mm x 29mm (1.14" x 1.14")	4028-5021
	BGA-100	16mm x 16mm (0.63" x 0.63")	4028-5022
	BGA-119	22mm x 14mm (0.87" x 0.55")	4028-5023
	BGA-169	19.25mm x 19.25mm (0.76" x 0.76")	4028-5024
	BGA-196	18.5mm x 18.5mm (0.73" x 0.73")	4028-5025
	BGA-240	26.4mm x 26.4mm (1.04" x 1.04")	4028-5026
	BGA-256	30mm x 30mm (1.18" x 1.18")	4028-5027
	BGA-475	25mm x 32.3mm (0.98" x 1.27")	4028-5028
	BGA-521	43mm x 43mm (1.69" x 1.69")	4028-5029
	BGA-540	44mm x 44mm (1.73" x 1.73")	4028-5030
	BGA-625	32.5mm x 32.5mm (1.28" x 1.28")	4028-5031
	BGA-169	22mm x 22mm (0.87" x .87")	4028-5032
	BGA-361	33mm x 33mm (1.29" x 1.29")	4028-5033
	BGA-720	47.5mm x 47.5mm (1.87" x 1.87")	4028-5034
	BGA-303	21mm x 25mm (0.83" x 0.98")	4028-5035
	BGA (Short Adpt.)	17mm x 17mm (0.67" x 0.67")	4028-5036
	BGA (Small Cup)	21mm x 21mm (0.83" x 0.83")	4028-5037
	Micro BGA-48	7.75mm x 5.6mm (0.31" x 0.22")	4028-5501
	Micro BGA-48	7.85mm x 6.40mm (0.31" x 0.25")	4028-5502
	Calibration Nozzle	27mm x 27mm (1.1" x 1.1")	4028-2010

PATTERN NOZZLES	COMPONENT TYPE	JET SPACING	JET LENGTH	PART NUMBER
	SOIC- 8 (JEDEC)	4.1mm (0.16")	6.1mm (0.24")	4028-4001-P1
	SOIC-14/16 (JEDEC)	4.1mm (0.16")	10.9mm (0.43")	4028-4002-P1
	SOICL-16 (JEDEC)	7.9mm (0.31")	10.9mm (0.43")	4028-4003
	SOICL-20 (JEDEC)	7.9mm (0.31")	13.5mm (0.53")	4028-4004
	SOICL-24 (JEDEC)	7.9mm (0.31")	16mm (0.63")	4028-4005
	SOICL-28 (JEDEC)	7.9mm (0.31")	18.5mm (0.73")	4028-4006
	SOICL-32 (JEDEC)	11.68mm (0.46")	20.83mm (0.82")	4028-4007
	TSOP-48 (Type I)	18.6mm (0.734")	13.5mm (0.53")	4028-4505
	TSOP-32/40/44/50 (Type II)	10.4mm (0.41")	21.35mm (0.84")	4028-4506
	SINGLE JET NOZZLES	SHAPE OF JET TUBE	NOZZLE SIZE (NOMINAL)	PART NUMBER
	Curved, Round	3.0mm diameter (0.1" diameter)	4028-1001-P1	
	Curved, Round	5.0mm diameter (0.2" diameter)	4028-1002-P1	
	Curved, Round	8.0mm diameter (0.3" diameter)	4028-1003-P1	
	Straight, Round	3.0mm diameter (0.01" diameter)	4028-1011-P1	
	Straight, Round	5.0mm diameter (0.2" diameter)	4028-1012-P1	
	Straight, Round	8.0mm diameter (0.3" diameter)	4028-1013-P1	
	Flat Jet	13.21mm length (0.52")	4028-1021-P1	
	Flat Jet	23.37mm length (0.92")	4028-1022-P1	
	BOX NOZZLES	COMPONENT TYPE	NOZZLE SIZE (NOMINAL)	PART NUMBER
	PLCC	32.5mm x 46.5mm (1.28" x 1.83")	4028-1501	
	PLCC-18 (Non Baffled)	8.5mm x 12.1mm (0.34" x 0.48")	4028-2001	
	PLCC-20 (Non Baffled)	10.2mm x 10.2mm (0.40" x 0.40")	4028-2002	
	PLCC-28 (Non Baffled)	12.8mm x 12.8mm (0.50" x 0.50")	4028-2003	
	PLCC-32 (Non Baffled)	12.8mm x 15.3mm (0.50" x 0.60")	4028-2004	
	PLCC-44 (Non Baffled)	17.9mm x 17.9mm (0.70" x 0.70")	4028-2005	
	PLCC-52	20.4mm x 20.4mm (0.80" x 0.80")	4028-2006	
	PLCC-68	25.5mm x 25.5mm (1.01" x 1.01")	4028-2007	
	PLCC-84	30.6mm x 30.6mm (1.20" x 1.20")	4028-2008	
	PLCC-100	38.9mm x 38.9mm (1.53" x 1.53")	4028-2009	
	QFP-80/100	18.1mm x 24.1mm (0.71" x 0.95")	4028-2501	
	QFP-64/80 (Non Baffled)	17.0mm x 17.0mm (0.67" x 0.67")	4028-2502	
	QFP-132	26.9mm x 26.9mm (1.06" x 1.06")	4028-2503	
	QFP-160	31.9mm x 31.9mm (1.26" x 1.26")	4028-2504	
	QFP-208	31.5mm x 31.5mm (1.24" x 1.24")	4028-2505	
	QFP-240	34.6mm x 34.6mm (1.36" x 1.36")	4028-2506	
	BQFP-100	23.5mm x 23.5mm (0.925" x 0.925")	4028-2507	
	BQFP-84	20.9mm x 20.9mm (0.8" x 0.8")	4028-2508	
	BQFP-132	27.1mm x 27.1mm (1.07" x 1.07")	4028-2602	
	TQFP-32 (Non Baffled)	11.5mm x 11.5mm (0.453" x 0.453")	4028-3002	
	TQFP-120 (Non Baffled)	15.5mm x 15.5mm (0.610" x 0.610")	4028-3004	
	TQFP-48	18.6mm x 18.6mm (0.734" x 0.734")	4028-4505	



## PREHEATERS

ALL PREHEATERS CAN BE USED AS STAND ALONE OR INTEGRATED WITH SYSTEMS

Preheating allows for the use of significantly lower and safer temperatures when conductive or convective tools are used for component installation or removals. Preheating is also required when installing area array components and large leaded devices. The application of heat from the bottom side of the PCB serves several functions: 1) it keeps the PCB from twisting or warping, 2) it maintains the planarity of the rework site, 3) it warms the PCB so heat applied by the top heater is not drawn away from the rework site, and 4) it ensures that homogenous temperatures across the package and PCB are maintained, allowing the use of safe, low temperatures for the top heater.

The ST 400 is an analog, closed loop, temperature controlled radiant 400 W pre heater. The heating area is 140mm x 140mm (5.5" x 5.5"). This preheater is ideal for heavy PCBs and for area array applications as the medium wave IR delivers the most penetrating and even heating available. The ST 400 can be used as a stand-alone unit with either the ST 525/ST 550 PCB holder or can be used with the ST 300, ST 325, or ST 350.

SPECIFICATIONS	ST 400
Part Numbers	8007-0435 ST 400 8007-0436 ST 400E
Power Requirements	97-127 VAC, 50/60 Hz or, 425 Watts max. 197-253 VAC, 50/60 Hz 425 Watts max.
Dimensions	105mm H x 178mm W x 318mm D (4.1" H x 7" W x 12.5" D)
Weight	2.3Kg (5lbs.)
Temperature Stability	± 3°C (± 5°F) at idle tip temp.
Absolute Temperature Stability	Meets or exceeds ANSI-H-STD
Temperature Range	37-205°C (100-400°F)



ST 400

The ST 450 is an analog, closed loop, temperature controlled convective 1500 W preheater. The heating area is 140mm x 140mm (5.5" x 5.5"). This preheater is ideal for applications where focused hot air is desirable or where cooling air is required after the application of heat such as area array applications. Additionally, the nature of hot air allows heat to get into those hard to reach places all too common on today's electronics.

The ST 450 can be used as is, or one of 3 "air wash" nozzles can be attached to focus the heat where it is needed. The ST 450 can be used as a stand-alone unit with either the ST 525/ST 550 PCB holder or can be used with the ST 300, ST 325, or ST 350. When used with the ST 325/ST 350 (with the optional software package) the heater activity of the ST 450 can be controlled through the ST 325 or ST 350. The ST 450 is completely self-contained and when in cooling mode, the airflow is increased to 50 cfm.

SPECIFICATIONS	ST 450
Part Numbers	8007-0433 ST 450 / 8007-0434 ST 450E
Power Requirements	97-127 VAC, 50/60 Hz or, 1000 Watts max. 197-253 VAC, 50/60 Hz 1500 Watts max.
Dimensions	105mm H x 178mm W x 318mm D (4.1" H x 7" W x 12.5" D)
Weight	2.4Kg (5.3lbs.)
Temperature Stability	± 3°C (± 5°F) at idle tip temp.
Absolute Temperature Stability	Meets or exceeds ANSI-H-STD
Temperature Range	37-205°C (100-400°F)
Heating Airflow	35 cfm
Cooling Airflow	50 cfm
Focus Nozzle Part Numbers	4058-0001-P1 1.5" Square Nozzle 4058-0002-P2 3" Square Nozzle 4058-0003-P3 4.5" Square Nozzle* (*Included with the system)



ST 450



## FIXTURES AND PCB HOLDERS

When using convective hand tools, such as the ST 300 and ST 325, it is often helpful to place the handpiece into a fixture that has the ability to control the z axis movement when trying to align or place a component. The ST 500 is an adjustable Z-Axis platform that accepts the handpiece from either the ST 300 or ST 325. The heat guard on the handpiece is replaced with a "swivel ring" which is placed on the ST 500. The swivel ring allows the handpiece to be adjusted for planarity to the PCB being worked on. The ST 500 features a sturdy, extruded base that will accommodate either the ST 400 or ST 450 preheater and can also be used with either of the PCB holders (ST 525 or ST 550).

SPECIFICATIONS	FIXTURES AND HOLDERS
Free Standing PCB Holders Part Numbers	6993-0258-P1 ST 500 6993-0253-P1 ST 525 6993-0254-P1 ST 550
ST 525 holds PCB's up to	305mm x 305 mm (12" x 12")
ST 550 holds PCB's up to	460mm x 460 mm (18" x 18")
Capabilities	Both come with short legs for bench-top use and with extended legs for use with either the ST 400 or ST 450 preheaters.



ST 525 with Short Legs



ST 550 with Long Legs

If you prefer your work to be angled, use two long legs in the back and 2 short legs in the front! These fixtures are ideal for prep-work, cutting leads, soldering, desoldering, inspection, and testing. Both feature spring loaded rails with cocking mechanism for easy PCB removal and insertion. A very flexible system can be created by combining the ST 500 with either PCB holder and the ST 300/ST 325 and the ST 400/ST 450.

ST 550 shown with ST 450



ST 500 with ST 325, ST 450 and ST 550





# FUME EXTRACTION

HAZARDOUS FUMES IN THE WORKPLACE RESULT IN INCREASED ABSENTEEISM AND EMPLOYEE TURNOVER



# FUME EXTRACTION

FX 50 & ARM-EVAC 50 FUME EXTRACTORS

## WHY IS FUME EXTRACTION NEEDED?

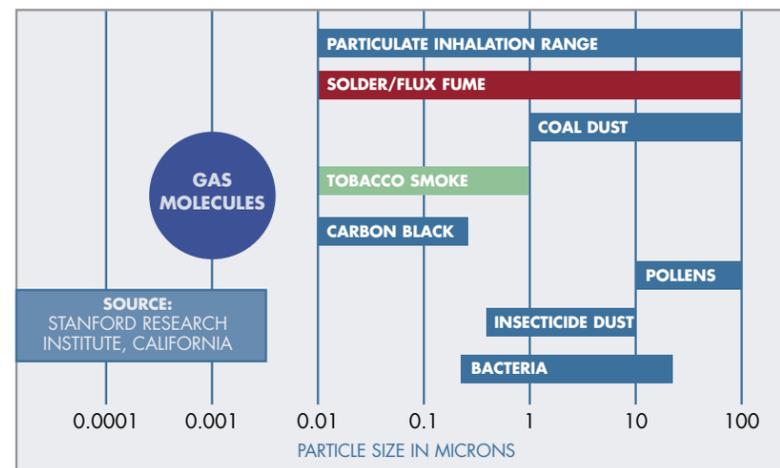
It's a fact... hazardous fumes in the working environment result in increased absenteeism, employee turnover, worker's compensation claims and lost productivity. Medical research has confirmed an increased incidence of occupational asthma, chronic bronchitis, allergic reactions, contact dermatitis and other health related effects associated with exposure to flux fumes. The substances in flux fumes are regulated by international health and safety agencies and many have been designated as Occupational Sensitizers which means that exposure should be eliminated or reduced to as low levels as possible. Where manual soldering is being performed or where solder-pots/fountains are utilized, hazardous fumes are produced and workers need to be protected from them.

## FACT: Exposure to Solder Fumes Leads to Respiratory illness

When rosin-based or rosin-containing fluxes are heated, a substance called colophony is produced, which is one of the major causes of occupational asthma. In order to reduce exposure to colophony, rosin-based fluxes have been exchanged for no-clean or synthetic fluxes that contain no rosin or very low percentages. While this reduces or eliminates exposure to colophony, new chemical irritants may be introduced into the work place, many of which pose a more substantial threat to workers. Over 95% of the total fume products from rosin-based fluxes are in the form of particulates. Chemical exposure from flux fume varies widely and is dependent on the chemical composition of the flux. Non-rosin or low-rosin fluxes use chemically aggressive substances such as acids, solvents, or alcohols in place of rosin to improve the cleaning action of the flux. **This is also true for Lead Free solders.** Exposure to these substances is also recognized as hazardous and when flux is heated, the resultant chemical by-products can be even more hazardous. Additionally, the use of cleaners, solvents or adhesives, which are common in electronic soldering applications, expose workers to chemical hazards.



The human body has been designed with defense mechanisms such as nasal passageways lined with mucus that will collect larger particles through a process known as impaction and ciliated breathing passageways to remove foreign substances from the main airways of the lungs. Flux fumes contain high levels of respirable particles (less than 3.5 microns in diameter similar in size to cigarette smoke) that can bypass these natural defense mechanisms, and deposit themselves in the gas-exchange region of the lungs, thereby posing the greatest exposure hazard.



**FACT: Material Safety Data Sheets for Fluxes Recommend the Use of Local Exhaust Ventilation Systems**

The Health effects caused by exposure to flux fumes tend to be forms of respiratory illness and contact dermatitis. However, since the components of flux fume are often designated as occupational sensitizers, chronic or prolonged exposure increases the severity of health effects. PACE Fume Extraction is a key element in protecting workers from being exposed to flux fume!

The bench-top FX 50 fume exhauster is designed to remove solder flux fumes and other workplace fumes from the operator's breathing zone. Harmful fumes are drawn through an activated carbon impregnated foam filter.

SPECIFICATIONS	FX 50
Power Requirements	Part No. 8884-0920 - 115 VAC, 50/60 Hz, 17 Watts
Airflow with filter	60m <sup>3</sup> /h (35CFM)
Dimensions	220mm (8.7") Wide x 270mm (10.6") High x 168mm (6.6") Deep
Weight	1591g (3.5lbs.)
Exhauster housing	Static Safe Plastic
Activated-carbon impregnated foam filter	130mm (5.1") Wide x 130mm (5.1") High x 68mm (0.4") Deep
Replacement filter	Part No. 8883-0200-P5 - Package of Five Filters

## Features

- High airflow fan
- Simple filter change out
- Variable mounting with pre-drilled holes
- Three height adjustments
- Easy swivel action
- Compact
- Portable
- Includes three filters

**FX 50**  
Available in 115V only



The Arm-Evac 50 is a unique, portable, cost-effective, bench-top fume extractor that provides wide area fume extraction or highly efficient source capture at up to two points using the optional arm attachment. The Arm-Evac 50 features operator adjustable airflow, quiet operation and a wide variety of filter options to meet the needs of virtually any application.

SPECIFICATIONS	ARM-EVAC 50
Unit	Arm-Evac 50 - 8889-0050
Power Requirements	115 or 230 VAC, 50/60 Hz
Size	215mm (8.5") H x 330mm (13.0") W x 315mm (12.5") D
Weight	6 Kg (13 lbs.)
Sound Level*	54 dBA
Standard Inlets	One laminar flow, plenum inlet
Flow Rate	Adjustable: 152 m <sup>3</sup> /h (90 cfm) max with Plenum One Arm Adjustable: 84.5 m <sup>3</sup> /h (45 cfm) max Two Arms Adjustable: 60 m <sup>3</sup> /h (30 cfm) max per arm
System Options	Dual Arm Accessory - 8886-0055
Standard Filters	Pre-Filter - 8883-0125-P5 General Purpose Filter - 8883-0280
Filtration Options	Clean room Filter - 8883-0290** Adhesive Filter - 8883-0295** Economy Filter - 8883-0300-P5**

Airflow and noise level are nominal numbers and will vary based on voltage  
\*\* Pre-filter also required.

## Features

- Operator Adjustable Airflow
- Plenum or Arm Extraction
- Static Safe
- Four Levels of Fume Filtration
- Filter Condition Monitoring
- Incorporates utility platform



**Arm-Evac 50**



**Arm-Evac 50** with Optional Dual Arm Attachment



# FUME EXTRACTION

ARM-EVAC 105 FUME EXTRACTOR & ESD SAFE FLEX ARM

# PRODUCT PAGE

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The best protection from harmful fumes in its price range. The Arm-Evac 105 is portable, compact and can be easily placed on or under a workbench. The unit features a heavy-duty, maintenance free brushless motor along with a filtration process which includes a pre-filter for coarse particle removal, and a High Efficiency Particulate Arrestor (HEPA)/Gas Filter cartridge. An inlet cap is provided to seal the unused inlet if only one flex arm is used.



SPECIFICATIONS	ARM-EVAC 105
Unit	Arm-Evac 105 - 8888-0110 Arm-Evac 105E - 8888-0105
Power Requirements	115 VAC, 60 Hz 230 VAC, 50 Hz
Dimensions	500mm (19.6")H x 290mm (11.5")W x 290mm (11.5")D
Weight	11.5 Kg (25.3 pounds)
Sound Level*	55 dBA
Number of Inlets:	Two 75 mm (3")
General Purpose Filter	Single Inlet: 220 m3/h (130 cfm); Dual Inlet: 118 m3/h (70 cfm) per inlet
Clean room Filter	Single Inlet: 187 m3/h (110 cfm); Dual Inlet: 105 m3/h (62 cfm) per inlet
# of Collection Accessories	Two 75mm (3") Flex Arms
Maximum Duct Run	2.5m (8') per inlet
Standard Filters	Pre-Filter - 8883-0111-P5 General Purpose Filter - 8883-0931
Filtration Options	Clean room Filter - 8883-0921* Adhesive Filter - 8883-0951* Extended Life Filter - 8883-0936** Economy Filter - 8883-0871*

\* Pre-filter also required. \*\* Requires Extended life Pre-filter - 8883-0938-P10  
Airflow and noise level are nominal numbers and will vary based on voltage

FILTER SELECTION CHART	Pre-Filter	High Capacity Pre-Filter	Economy Filter	General Purpose Filter	Cleanroom Filter	High Capacity Filter	Adhesive Filter
FX 50	N/A	N/A	883-0200-P5	N/A	N/A	N/A	N/A
Arm-Evac 50	8883-0125-P5	N/A	8883-0300-P5	8883-0280	8883-0290	N/A	8883-0295
Arm-Evac 105	8883-0111-P5	8883-0938-P10*	8883-0871	8883-0931	8883-0921	8883-0936*	8883-0951

\* High Capacity Pre-filters must be used in combination with a High Capacity Filter. When Filters need to be replaced, simply remove them from the Fume Extractor and replace with a new one. Disposal of Filters should be done in compliance with local environmental regulations.

ESD Safe Flex-Arm (P/N 8886-0750) - The most versatile and economical collection accessory.



**ESD Safe Flex Arm**

SPECIFICATIONS	ESD SAFE FLEX ARM
ESD Rating	Surface Resistivity: 1.00E3 Ohm Volume Resistivity: <6.00E2 Ohm-cm
Length	915mm (36")
Diameter	75mm (3")
Mounting	Directly onto Fume Extractor or uses optional Bench Mounting Bracket
Standard Endpiece	Round

ESD Safe Flex-Arm Quick-Mount Bench Mounting Bracket Kit (P/N 8886-0745) allows the ESD Safe Flex-Arm to be mounted virtually anywhere. Quick Mount clamp allows for arm and bracket to be repositioned in seconds. Kit includes 25m (8') of 75mm (3") ESD Safe flexible hose. \*\*\*BEST VALUE\*\*\* ESD Safe Flex-Arm Kit (8886-0765) contains everything needed to mount an ESD Safe Flex-Arm to a workbench. The kit includes: (1) ESD Safe Flex-Arm (P/N 8886-0750) and (1) Quick-Mount Bench Mounting Bracket Kit (P/N 8886-0745).

PACE provides innovative solutions, products and training for the assembly, rework, repair and testing of printed circuit boards. PACE's unique capabilities and evolving vision have provided universal solutions to thru-hole and surface-mount assembly and rework problems for the most advanced electronics. Our strong commitment and history of achievement has resulted in an unparalleled range of Assembly, Repair and Fume Extraction systems to meet your company's needs whether working to ISO-9000, industrial, military or your own internal specifications. Whatever the challenge, PACE stands ready to provide the best, cost-effective solution for you.

ST SYSTEMS	ST 30	ST 50	ST 70	ST 100	ST 115
PACE's new ST systems offer the most innovative control technology ever developed - IntelliHeat. ST systems are capable of providing the widest range of applications and flexibility by simply adding additional handpieces. Regardless if you are a small or large shop, ST systems are the right answer for you!					
FUME EXTRACTION	ARM-EVAC 105	ARM-EVAC 250	FUMEFLO WORKTABLE	ARM-EVAC 50	
PACE's Fume Extraction Systems feature the latest advancements in filter condition monitoring and process control as well as cost effective solutions. A variety of collection accessories are available.					
MBT/PRC SYSTEMS	MBT 350	PRC 2000			
PACE offers a broad range of rework and repair products to meet all your repair needs. Whether you are replacing a surface mount component, repairing a multi-layer printed circuit board, or making a plated thru-hole repair.					
THERMOFLO SYSTEMS	TF 1700	TF 2700	XR 3000		
PACE's family of ThermoFlo products offer complete solutions from simple surface mount removal and installation to delicate BGA and CSP rework. PACE's new inspection systems feature X-Ray and endoscopic technology to really "SEE" the results of your processes.					
CONVECTIVE & PRE-HEAT	ST 300	ST 350	ST 525	ST 450	
PACE's new family of hot air rework systems are ideal for all SMT applications. A wide range of product features are available to meet your specific needs. They can be easily upgraded by adding one of our powerful preheaters and/or PCB holders.					

# SOLUTIONS FOR THE ELECTRONICS INTERCONNECTION PROCESS

## A WORLDWIDE COMMITMENT

With offices worldwide, PACE is a recognized world leader in the development of solutions for the assembly and repair of highly advanced electronics. Our expertise extends back to the dawn of the modern electronics industry. In 1958, PACE introduced training programs for the repair of printed wire assemblies and soon after, revolutionized the industry by creating the first self-contained vacuum desoldering system.

Today, PACE continues to provide innovative solutions, products and training for the rework, repair and testing of printed circuit assemblies. Our unique capabilities and evolving vision have provided universal solutions for thru-hole and surface mount assembly and rework problems for the most advanced electronics.

Additionally, PACE manufactures Fume Extraction Systems to reduce exposure to harmful particulates and gases created from hand soldering operations. PACE Fume Extraction Systems effectively remove these contaminants from the worker's breathing zone thereby reducing or eliminating health risks and improving productivity.

Our strong commitment and history of achievement has resulted in an unparalleled range of Assembly, Repair and Fume Extraction solutions to meet your needs whether working to ISO-9000, industrial, military or your own internal specifications. Whatever the challenge, PACE stands ready to help you set a new standard.

## A CUSTOMER COMMITMENT

In 2001 the distinguished Frost & Sullivan Award for the World Surface Mount Technology Rework and Repair Equipment Industry was bestowed upon PACE.

The Frost & Sullivan Market Engineering Customer Service Leadership Award is presented to companies that have demonstrated superior responsiveness to customer needs and value-added support in technology and services.

PACE was selected based upon independent research with customers, key market participants and even our competition. This award reiterates PACE's commitment to excellence from product concept to customer service in the field. Frost & Sullivan's research recognizes that the key to PACE's success in the industry is our interactive approach with customers to provide solutions and respond to end-user feedback when developing products.



### PACE USA

255 Air Tool Drive, Southern Pines,  
NC 28387 U.S.A.  
T: 910-695-7223 F: 910-695-1594

### PACE EUROPE

Technology Centre, Kelvin Drive, Knowlhill,  
Milton Keynes, MK5 8NH United Kingdom  
T: (44) 1908-277666 F: (44) 1908-277777

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In 2002 PACE was awarded World Class Status, signifying that PACE uses best practices in its design, development and manufacturing processes to provide the finest quality products to its customers at the lowest possible cost. The first Maryland based company to receive this coveted award, PACE stands alone in its market segment in achieving this highly regarded status.

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