



# CONVECTIVE SOLUTIONS TF 1700 & TF 2700

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

PACE's ThermoFlo Systems (TF 1700 & TF 2700) are the next generation in automated, cost effective solutions for area array package rework. No other systems on the market have the advanced features found on these systems or is easier to use, ensuring operator acceptance and success! Designed for today's PCBs, ThermoFlo 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.

Both units are fitted with a custom designed 1200 watt top-side heater and an incredibly efficient, IR, bottom-side heating platform. ThermoFlo systems 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 PCB holder features fine micrometer adjustment for the most delicate X and Y axis alignments. Precise and accurate, within 25  $\mu\text{m}$  (.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. Both systems are self-contained and do not require an external air supply or vacuum connections. Upgrade your area rework capabilities and through-put with ThermoFlo!



**TF 1700**



**TF 2700**



# TF 1700 & TF 2700 SYSTEM SOFTWARE

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



## 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 (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.



## PRODUCTION SCREEN

- Password lockout ensures process control by restricting operator access to profile parameters.
- Profile process tracked by color-coded "Status Indicator" and graphical user interface (GUI).
- 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.



## ALIGNMENT SCREEN

- 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.



## INSPECTION SCREEN

- View, save, and manage images from up to two inspection sources.
- Integrated rework function with inspection function.
- Reference library for immediate operator feedback
- Create inspection reports in PDF format
- Verify process results immediately
- Compatible with LS 3000, XR 3000, and XR 4000



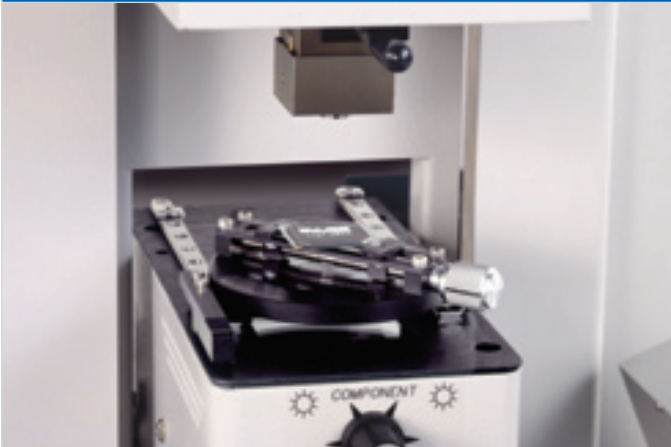
## SETUP SCREEN

- Active password lockout on Profile Development Screen.
- Set upper and lower temperature parameters for graphical interface.
- View software in choice of 5 languages.
- Set-back mode and Auto off function.
- Access diagnostic tools and trouble-shooting logs

# THE ONLY PRODUCTS YOU'LL EVER NEED

FLEXIBILITY AND HIGH PERFORMANCE TO MEET ALL YOUR REWORK REQUIREMENTS

## COMPONENT PICK-UP



Nested PBGA about to be picked up by Vacuum pik

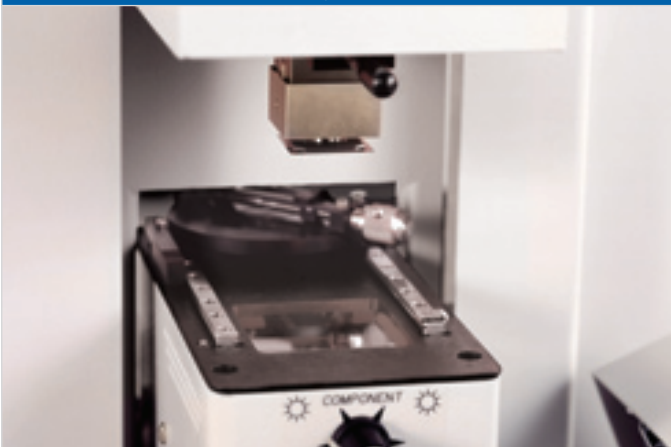
## COMPONENT PICK-UP

- 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 ALIGNMENT/PLACEMENT



PBGA being held by Vacuum pik during Alignment procedure

## 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 systems feature a 1200 Watt top-heater. With closed loop temperature control and unique vented nozzle design; 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 systems are N2 capable as standard.

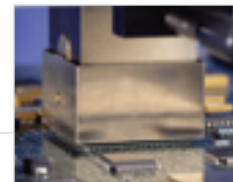
## COMPONENT REFLOW



Nozzle lowering over PBGA for reflow



# TF1700 & TF2700 SPECIFICATIONS



TF 1700	SPECIFICATIONS
Part Numbers	8007-0465 120 VAC Unit 8007-0466 230 VAC Unit
Heater (top side)*	Convective (air or N <sub>2</sub> ), 1200 Watts
Bottom Heater*	IR, 400 Watts x 1
with adjustable working height	220mm x 155mm (8.6" x 6.1")
*Heater function continuously monitored by PC closed loop control	
Max Component size	65mm x 65mm (2.5" x 2.5")
Max PCB size	305mm x 305mm (12" x 12")
Airflow maximum	Self contained, manual adjust, 20SLPM
N <sub>2</sub> Option	Standard
Resolution on Optics adjustment	0.52mm (0.02") per rotation
Positioning Accuracy (Z axis)	± 25 μmeters (0.001")
Vacuum	450mm Hg
Power requirements	120 VAC, 60 Hz or 230 VAC, 50 HZ (2000 watts maximum)
Optics	High resolution, Vision Overlay System
Video inputs	2 Composite Video, 1 "S" Video (for alignment optics)
Temperature setting range	Top Heater: 100° to 400° C (212° to 750° F) Bottom Heater: 100° to 221° C (212° to 430° F)
Dimensions	737mm H x 686mm W x 737mm D (29" H x 27" W x 29" D)
Weight (Without Computer)	45kg (100lbs.)
Video Monitor Viewable area	380mm (15") Integrated Color Flat Panel LCD Monitor
Board Supports	Included
Optical Alignment Kit	Included

TF 2700	SPECIFICATIONS
Part Numbers	8007-0467 120 VAC System 8007-0469 230 VAC System
Heater (top side)*	Convective (air or N <sub>2</sub> ), 1200 Watts
Bottom Heater*	IR, 1300 W total (400 Watts x 1 & 150 W x 6)
with adjustable working height	405mm x 405mm (16" x 16")
*Heater function continuously monitored by PC closed loop control	
Max Component size	65mm x 65mm (2.5" x 2.5") max
Max PCB size	610mm x 610mm (24" x 24")
Airflow maximum	Self contained, PC controlled, adjust up to 20SLPM
N <sub>2</sub> Option	Standard
Resolution on Optics Adjustment	0.52mm (0.02") per rotation
Positioning Accuracy (Z axis)	± 25 μmeters (0.001")
Vacuum	450mm Hg
Power requirements	120 VAC, 60 Hz or 230 VAC, 50 HZ (2800 watts maximum)
Optics	High resolution, Vision Overlay System
Video inputs	2 Composite Video, 1 "S" Video (for alignment optics)
Temperature setting range	Top Heater: 100° to 400° C (212° to 750° F) Bottom Heater: 100° to 221° C (212° to 430° F)
System Dimensions	815mm H x 737mm W x 790mm D (32" H x 29" W x 31" D) (PCB holder rails increase width to 1140mm (45"))
Weight (Without Computer)	91 kg (200lbs.)
Video Monitor Viewable area	431 mm (17") Integrated Color Flat Panel LCD Monitor
Board Supports	Included
Optical Alignment Kit	Included

# THERMOFLO NOZZLE CHART

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

MAXIMUM COMPONENT SIZE	NOZZLE DIMENSIONS	NOZZLE P/N
5mm x 5mm (0.19" x 0.19")	8mm x 8mm (0.31" x 0.31")	4038-7001
6mm x 6mm (0.24" x 0.24")	9mm x 9mm (0.35" x 0.35")	4038-7042
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
8mm x 8mm (0.31" x 0.31")	11mm x 11mm (0.43" x 0.43")	4038-7041
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 (1.12" 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

MAXIMUM COMPONENT SIZE	NOZZLE DIMENSIONS	NOZZLE P/N
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
32.5mm x 23mm (1.28" x 0.90")	35.5mm x 26mm (1.40" x 1.02")	4038-7051
32.5mm x 25mm (1.28" x 0.98")	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

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

