

# TSM REFLOW OVEN 2019





# COMPANY INFORMATION

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# PRODUCT INFORMATION

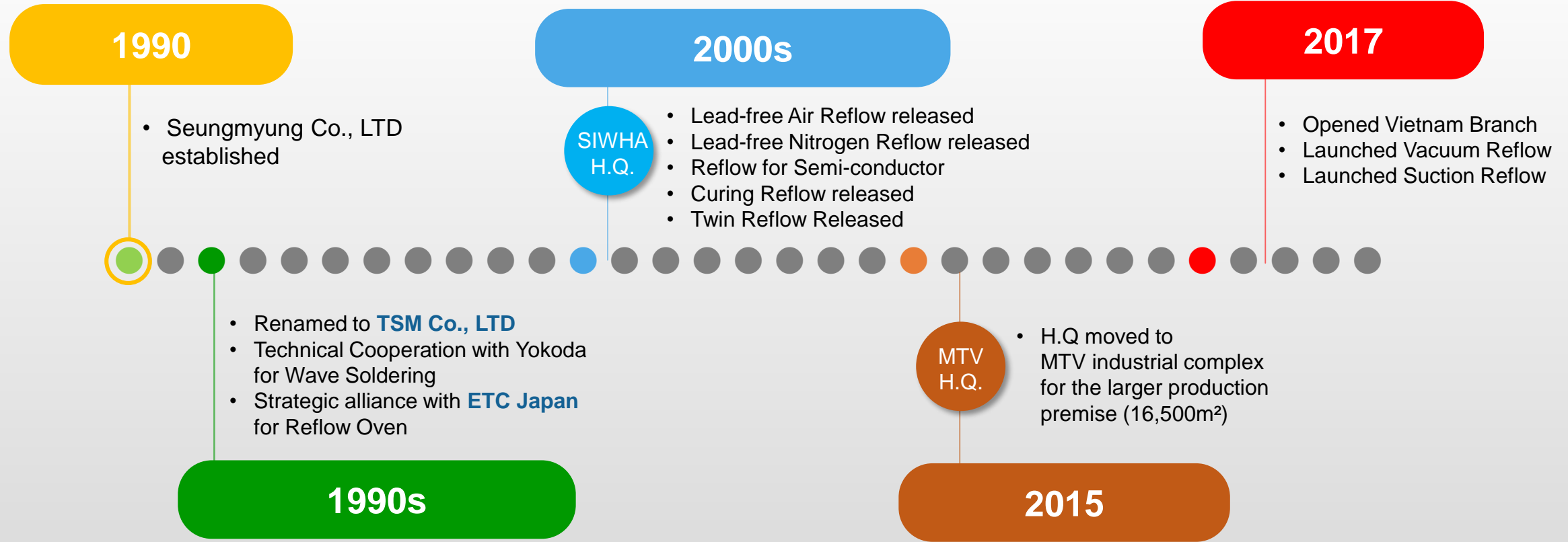
1. REFLOW LINE-UP
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# COMPANY OVERVIEW

NAME	TSM CO., LTD
ESTABLISHED	JANUARY 9, 1990
CEO	KYU BONG, PARK
WORK FORCE	60 people
HQ & FACTORY	57 MTV 26RO, 20 BEON GIL, SIHEUNG SI, GYEONGGI DO, KOREA
BUSINESS	REFLOW OVEN, PSA (NITROGEN GENERATOR)
PRODUCTION FACILITY	16,500 M <sup>2</sup>
APPROVAL	ISO 9001, ISO14001, GOST, S-MARK, CE
WEBSITE	<a href="http://www.tsms.kr">www.tsms.kr</a>



# MILESTONES

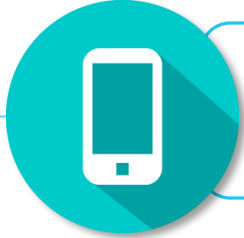


# CUSTOMERS

OVER  
**29**  
YEARS

SERVING  
**700**  
CUSTOMERS

installed  
**4600**  
ovens throughout  
the world



## MOBILE



## SEMI CONDUCT



## ELECTRONICS



## AUTOMOTIVE & MILITARY



# Why TSM ?

## KOREA NO. 1 REFLOW OVEN & PSA BRAND

Over the past 29 years, TSM has been supplying 1<sup>st</sup> class reflow oven solutions and services to internationally renowned manufacturers for wide application from electronics, automotive to semi-conductors.

Fully equipped with in-house machining job center including Laser cutting machines and CNC multi-functional sheet-metal machines, TSM is able to deliver the customized solutions with the satisfactory services and the best operational performance at the best delivery schedule from one-stop manufacturing process.



## WORLD 1<sup>ST</sup> CLASS QUALITY STANDARD

- Proven Quality chosen by Apple & Samsung
- 100% Made in Korea
- 100% Made of World-class component brand



## FULL PRODUCT RANGE

- Air, N2, Vacuum all available
- Wide range of Application area from Consumer electronics, automotive, semi-conductors, Mobiles
- Customization available



## LOWEST OPERATION COST

- Fail-proof Operation
- Designed for Lowest Energy Consumption
- Minimum maintenance & Maximum Production



## ENGINEERING INNOVATION

- Smart Monitoring & System management
- World-first Built-in PSA in Reflow system
- Patented Flux Management

# PRODUCTION FACILITY

- **16,500 m<sup>2</sup>** newly opened Production Site
- **100** units of Reflow Ovens for Monthly Production
- Industry's Best Delivery Schedule
- Customization available
- In-house Machining & Job Center fully equipped
  - 2 Laser Machines
  - 5 Bending Machines
  - Welding Machine
  - Grinding Machine
  - NCT Machine
  - Multi-Functional Platform



# Product Information

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# REFLOW OVEN FULL LINE-UP



- TRN-Reflow**
- Maximization of Heat Efficiency through Triple Heat Insulation
  - Improved maintainability
  - Flux suppression system
  - Electrical and Electronic Equipment Containing Large Amount of Flux
  - Improved Flux Recovery Function (2 times compared to the existing function)



- TRA Reflow**
- TVs / Computers / LEDs / BLUs / Set-top Boxes / Electrical and Electronic Equipment for Automobiles / Medical Appliances, etc.



- Vacuum Reflow (Technical cooperation with ETC)**
- Power Devices, etc.



- Suction Reflow (Semiconductor Reflow)**
- Flip chip / Bonding Package



- N<sub>2</sub> GENERATOR**
- Supplies high purity N<sub>2</sub> gas to the N<sub>2</sub> Reflow stably



- Twin Reflow**
- TVs / Computers / Mobile Phones / LEDs / BLUs / Set-top Boxes / Electrical and Electronic Equipment for Automobiles / Medical Appliances, etc.



- Dual Reflow**
- TVs / Computers / Mobile Phones / LEDs / BLUs / Set-top Boxes / Electrical and Electronic Equipment for Automobiles / Medical Appliances, etc.



- Compact / Slim Reflow**
- Flip Chips / BGAs / Pre-flux, etc.



- Single-sided Reflow**
- Alternative Use for Wave Soldering Power Boards / Electrical and Electronic Equipment for Automobiles / Set-top Boxes, etc.



- LED / BLU Reflow**
- Large LEDs / BLUs / Lighting / Large Test Boards / TVs



## FLEXIBILITY

Wide Selection of Reflow available for Product, Factory Space, Budget



## SUPERB ENERGY EFFICIENCY

Energy saving structure for accurate PPM Control, Multi-step Start-up and Heat management  
Excellent Thermal Management



## EASY TO USE OPERATION

Operator Friendly Monitoring & Intuitive Operation  
Real Time O<sub>2</sub> PPM Control  
Real Time Temperature Profile



## ENVIRONMENT FRIENDLY

Lead-free Soldering  
Low CO<sub>2</sub> emission



## INDUSTRY 4.0

Smart Monitoring & Management by Central PC  
Remote Control

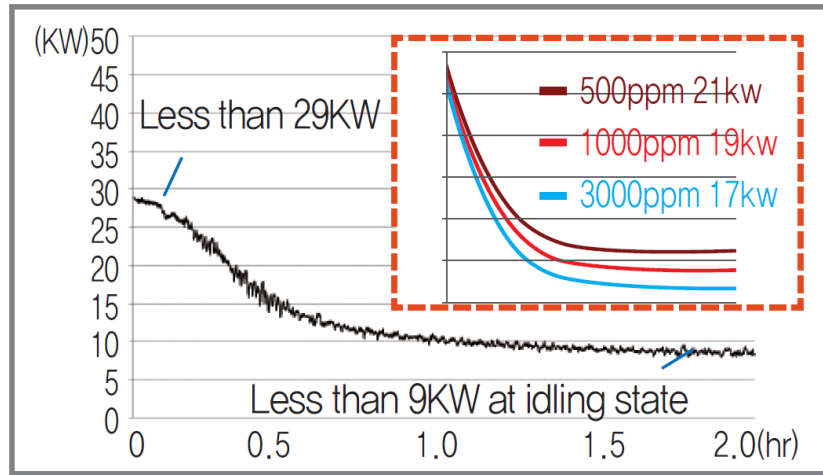
# AIR REFLOW

# TRA I-F SERIES



- Newly-launched Ultra Low Energy Consumption Air Reflow Oven
- Excellent Thermal management thru RTPM(Real-time Thermal Profile Management)
- Maintenance-free Structure
- Unbeatable Cost of Ownership

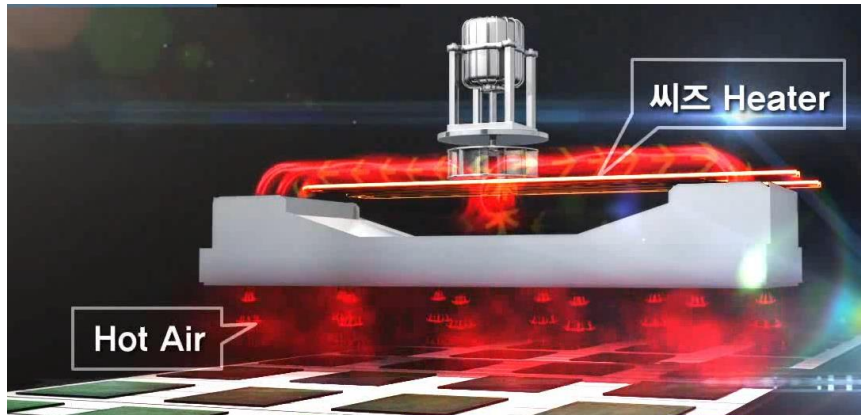
## ULTRA ENERGY SAVING - Multi-step Sequential Start-up



## RTPM Real time temperature profile monitoring system \* OPTIONAL

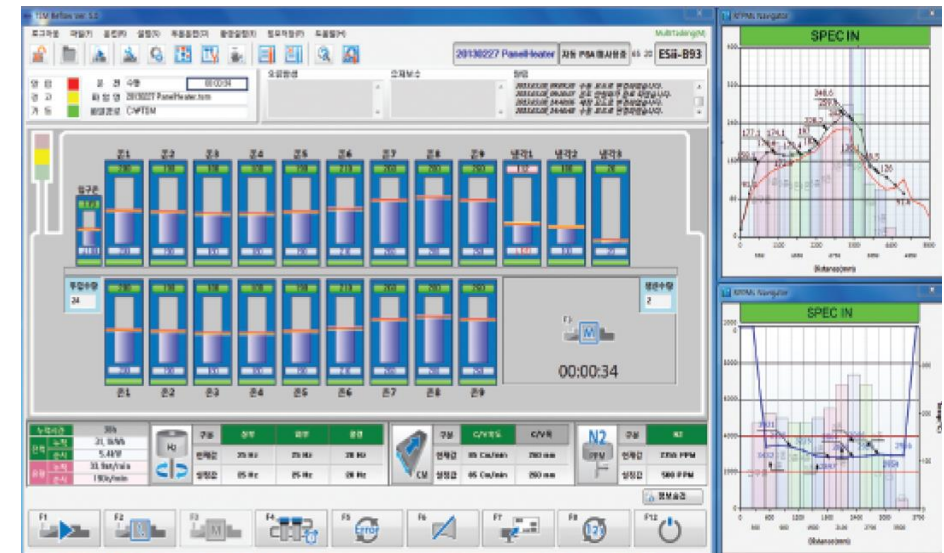


## EXCELLENT HEAT MANAGEMENT & THERMAL EFFICIENCY



High Power Motor ensures highly reliable heat distribution and minimizes the temperature deviation.

## OPERATOR-FRIENDLY GRAPHIC INTERFACE Intuitive Temperature Monitoring & Fail-proof Maintenance Alarm

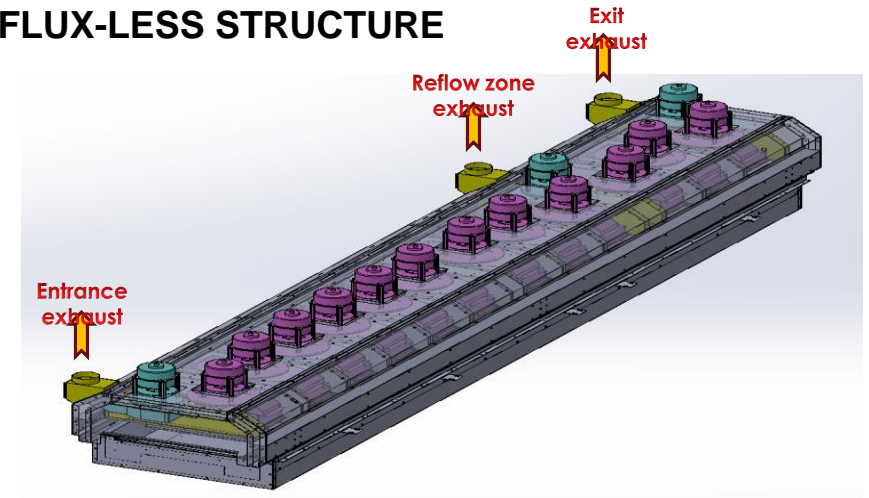


## MINIMUM COST OF OWNERSHIP



- Best Price-to-Performance Feature
- Industry's lowest operational cost from high energy efficiency
- Lowest Downtime and Maximized productivity

## FLUX-LESS STRUCTURE



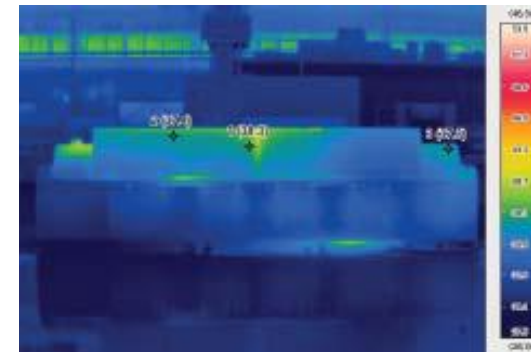
- Higher performance of Flux Extraction
- Ensures the machine cleaner and soldering quality

## Ensured Durability & Reliability



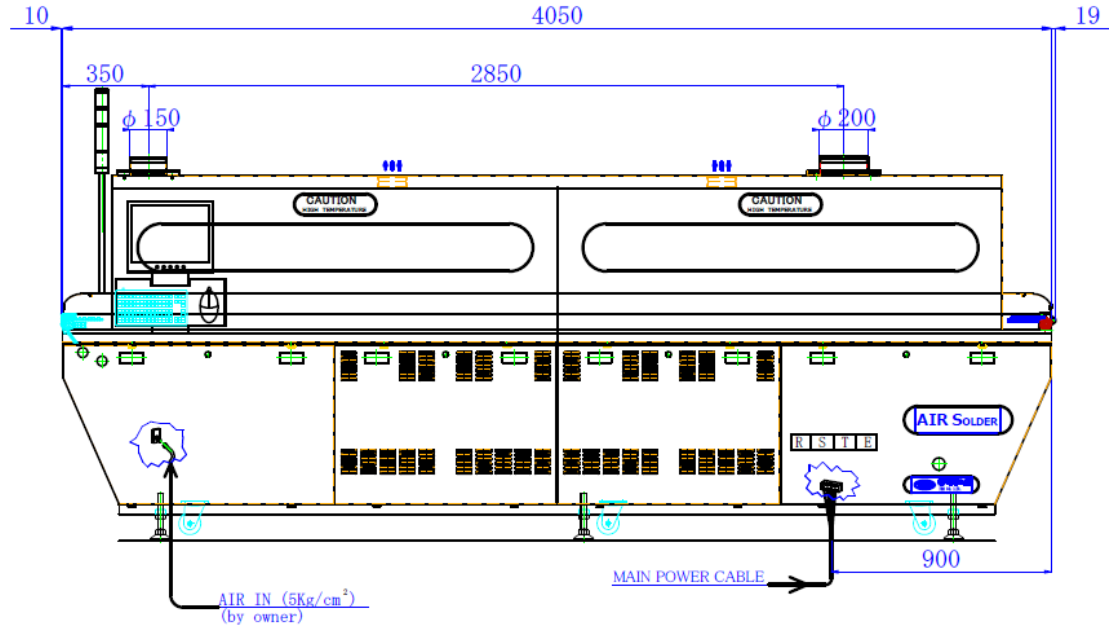
- World-best Brand Core components like Omron PLC, Fuji Inverter
- Specially treated steel structure to prevent the distortion from the heat
- Overheat Alarm sensors for Blower Motor

## EXEPTIONAL COOLING PERFORMANCE

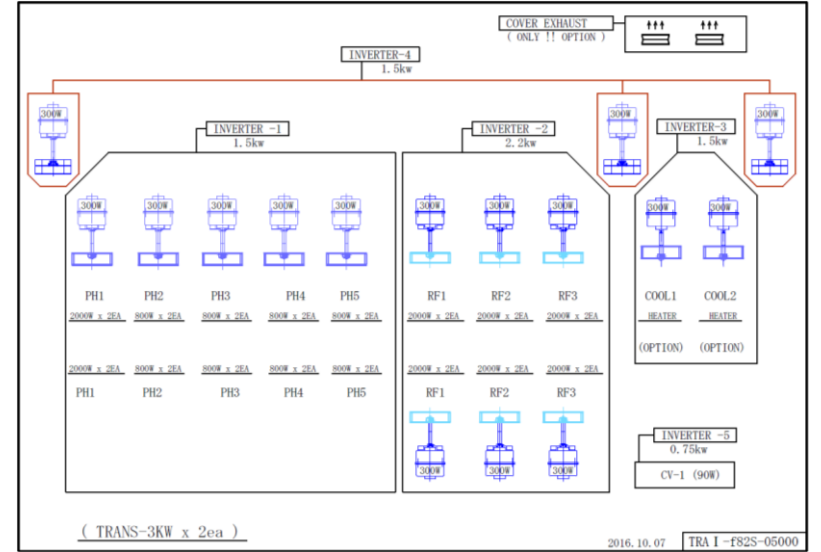
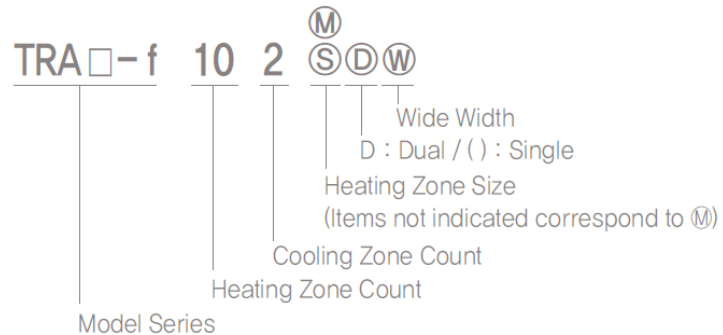


- Multi-zone Air Cooling standard, Water cooling optional
- Guarantees the optimum soldering capability
- Minimizes heat loss and results in low power consumption

## DIMENSION (TRA I-F82)



### Model Numbering



### Power consumption

Start-up : 35kw (standard)

Operation : 10kw

# specification

# AIR REFLOW

MODEL	TRA I-F71	TRA I-F82S	TRA I-F82	TRA I-F92	TRA I-F93	TRA I-F123
PCB SIZE (MM)	50 ~ 460 (500MM OPTIONAL)					
TOTAL HEATING LENGTH (MM)	2,000	2,190	2,590	2,900	2,900	3,840
ONE HEATING ZONE LENGTH (MM)	310	258	258	310	310	310
ON-ROAD LENGTH(MM)	900 ± 20					
OFF-ROAD LENGTH(MM)	900 ± 20					
TOP HEATING ZONES	7	8	8	9	9	12
BOTTOM HEATING ZONES	7	8	8	9	9	12
COOLING ZONES	1	2	2	2	3	3
CHAIN (ATT SYS CHAIN)	0	0	0	0	0	0
CONVEYOR SPEED	0.3 ~ 1.6M / MIN					
CONVEYOR TYPE	CHAIN + Option (Anti-warp or Mesh)					
REPEATABILITY	± 1°					
TEMPERATURE ACCURACY	± 1°					
SET-UP TIME	30 ~ 40 min					
PROFILE CHANGE TIME	15 ~ 30 min					
PCB COUNTER	Yes					
PROFILE FUNCTION	OPTION					
SELF DIAGNOSIS	Message Alarm					
PCB HEIGHT (TOP/BOTTOM) (MM)	25/20					
COOLING TYPE	AIR COOLING					
CONTROL TYPE	PC CONTROL					
MONITOR	LCD MONITOR					
SOFTWARE	WINDOWS 8					
BLOWER FAN INVERTE CONTROL	0	0	0	0	0	0
CONVEYOR WIDTH PC CONTROL	OPTION					
CONVEYOR DRIVING INVERTER CONTROL	0	0	0	0	0	0
PLC KIT	0	0	0	0	0	0
TEMPERATURE KIT	0	0	0	0	0	0
POWER SUPPLY	3P 380V OR 220V (50/60HZ) or OTHERS, AVAILABLE ON DEMAND					
AIR PRESSURE	5 KG/CM <sup>2</sup>					
AVERAGE POWER CONSUMPTION IN OPERATION	10KW	10KW	10KW	11KW	11KW	13KW
WEIGHT (KGS)	1100	1300	1500	1750	1800	2700

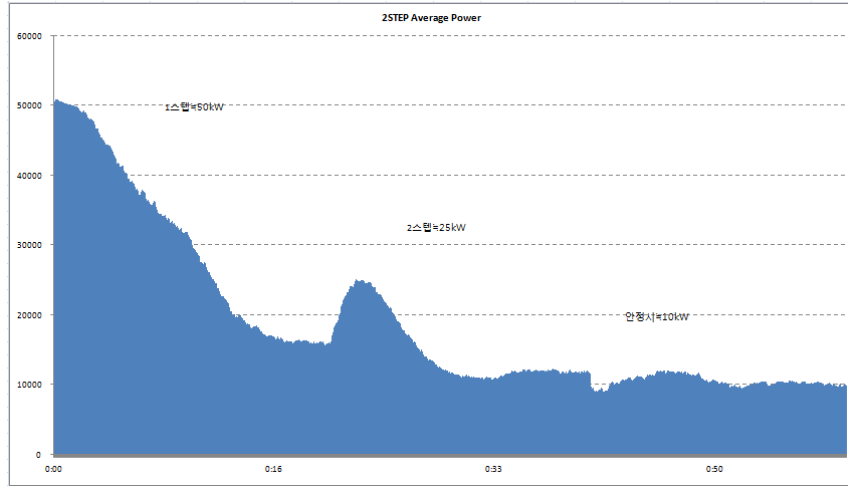
# N2 REFLOW

- The very best of Nitrogen Reflow Oven in every aspects of soldering quality, energy saving, flux recovery
- Achieved the industry's lowest N2 consumption level
- Excellent Thermal management thru RTPM(Real-time Thermal Profile Management)
- Maintenance-free design
- Unbeatable Cost of Ownership
- PSA built-in type, Dual Flux Management System available



# TRN-11-e SERIES

## ULTRA ENERGY SAVING 9KW when stabilized(based on TRN II E-93M)

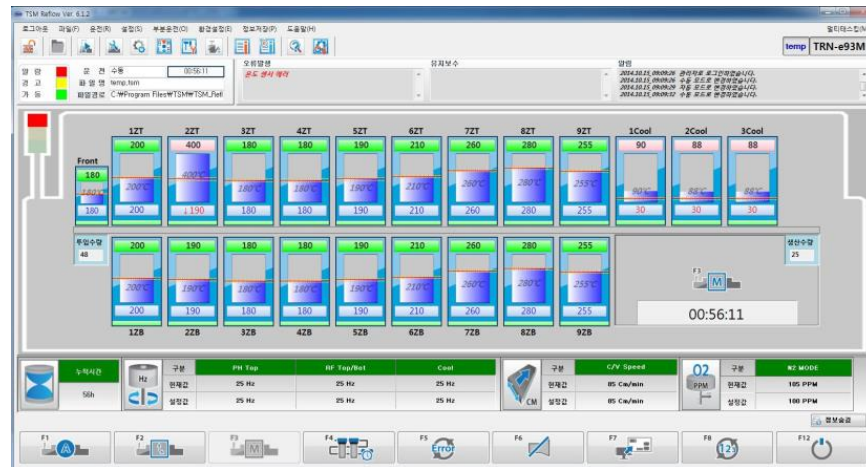


## RTPM Real time temperature profile monitoring system with T-profiler

\* OPTIONAL



## OPERATOR-FRIENDLY GRAPHIC INTERFACE



## RPPM Minimum N2 Consumption & Perfectly balanced N2 PPM level





## FLUX MANAGEMENT SYSTEM



- Exhibits highly efficient flux recollection and reduces contaminants
- Extended PM cycle and improved maintainability

## AUTO FAILURE DETECTION & ALARM SYSTEM

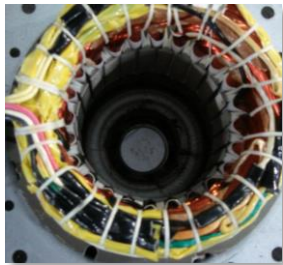


CHAIN OIL LEVEL ALARM



FLUX LEVEL ALARM

## MAINTENANCE FREE DESIGN



### Super Power Blower Motor

- Optimized Convection Efficiency
- Overheat prevention sensor
- Operating even at 140 °C
- Guaranteed Productivity



### One-Touch Detachable FMS

- Easy Maintenance
- Extendable for Dual FMS

## Interlocking to High-power N<sub>2</sub> Generator - Built-in or External(optional)

Built-in Type PSA



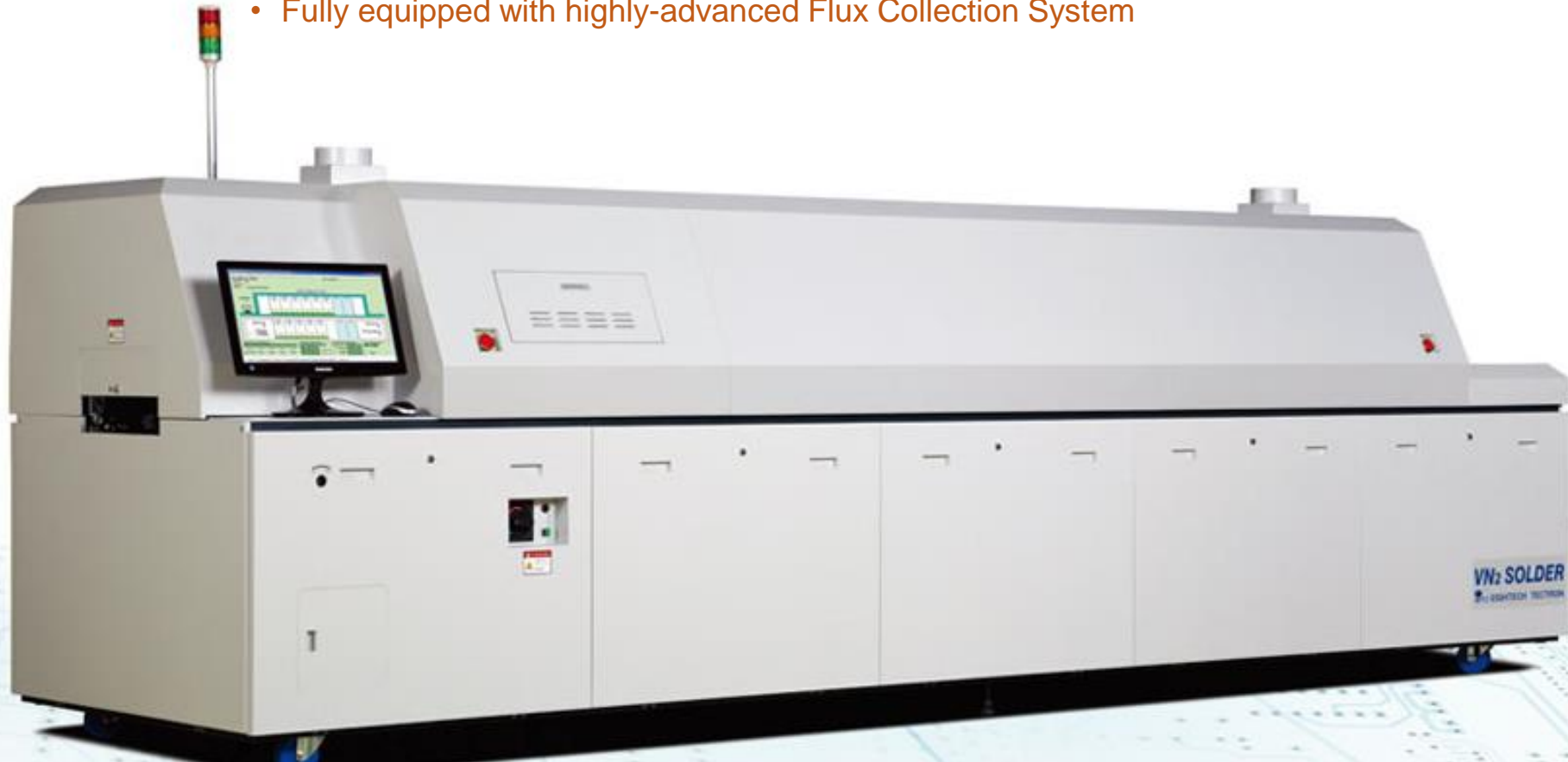
## specification

MODEL	TRN II-E93M	TRN II-E102S	TRN II-E103S	TRN II-E103M	TRN II-E123M	TRN II-E132M
PCB SIZE (MM)	50 ~ 460					
TOTAL HEATING LENGTH (MM)	3,000	2,780	2,780	3,310	4,030	4,350
ONE HEATING ZONE LENGTH (MM)	310	258	258	310	310	310
CONVEYOR HEIGHT (MM)	900 ± 20					
TOP HEATING ZONES	9	10	10	10	12	13
BOTTOM HEATING ZONES	9	10	10	10	12	13
COOLING ZONES	3	2	3	3	3	2
CHAIN (ATT SYS CHAIN)	0	0	0	0	0	0
CONVEYOR SPEED	0.3 ~ 1.6M / MIN					
CONVEYOR TYPE	CHAIN + Option (Anti-warp or Mesh)					
SET-UP TIME	30 ~ 40 min					
PROFILE CHANGE TIME	15 ~ 30 min					
PCB COUNTER	Yes					
PROFILE FUNCTION	OPTION					
SELF DIAGNOSIS	Message Alarm					
PCB HEIGHT (TOP/BOTTOM) (MM)	25/20					
FLUX MANAGEMENT SYSTEM	0	0	0	0	0	0
COOLING TYPE	AIR COOLING					
N2 GAS	0	0	0	0	0	0
O2 ANALYZE	0	0	0	0	0	0
N2 GAS CONSUMPTION	8-18 Nm³/h					
AUTO O2 PPM CONTROL	0	0	0	0	0	0
N2 CONTROL UNIT	0	0	0	0	0	0
CONTROL TYPE	PC CONTROL					
MONITOR	LCD MONITOR					
SOFTWARE	WINDOWS 7/8					
BLOWER FAN INVERTE CONTROL	0	0	0	0	0	0
CONVEYOR WIDTH PC CONTROL	OPTION					
CONVEYOR DRIVING INVERTER CONTROL	0	0	0	0	0	0
PLC KIT	0	0	0	0	0	0
TEMPERATURE KIT	0	0	0	0	0	0
POWER SUPPLY	3P 380V OR 220V (50/60HZ) or OTHERS, AVAILABLE ON DEMAND					
AIR PRESSURE	5 KG/CM²					
LENGTH (MM)	5,590	5,050	5,370	5,900	6,660	6,660

# N2 REFLOW

# Revolutionary Voidless Reflow System

- Ultimate Void-free Reflow System – Less than 1% of Void Area
- Maximized soldering quality guaranteed
- IR Convection Heating System
- Optimal for inline Mass Production - Achieved 30 sec. TACT time
- Eco-friendly, Lowest Energy Consumption
- Fully equipped with highly-advanced Flux Collection System

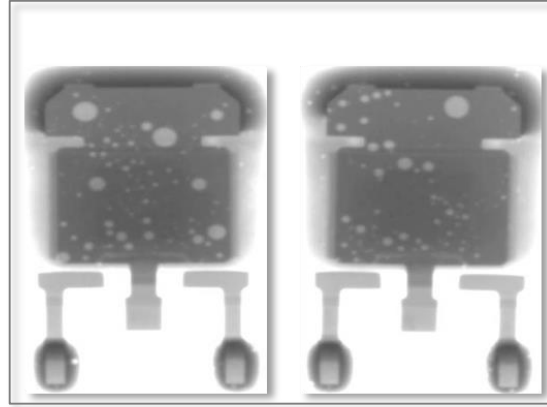


## Ultimate Voidless Soldering

- Less than 1% Void Area achievable

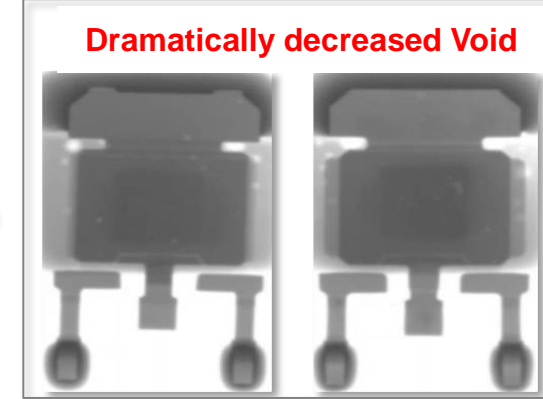


N2 ONLY SOLDERING

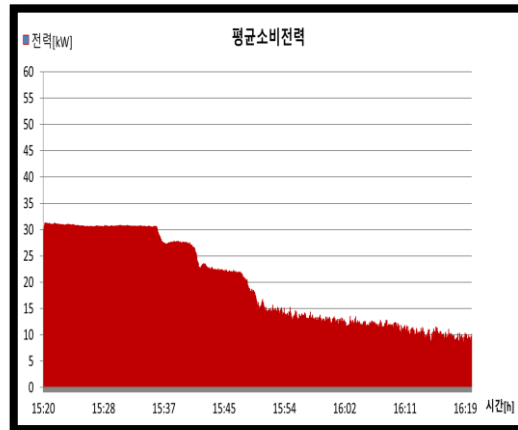


N2 + **VACUUM** SOLDERING

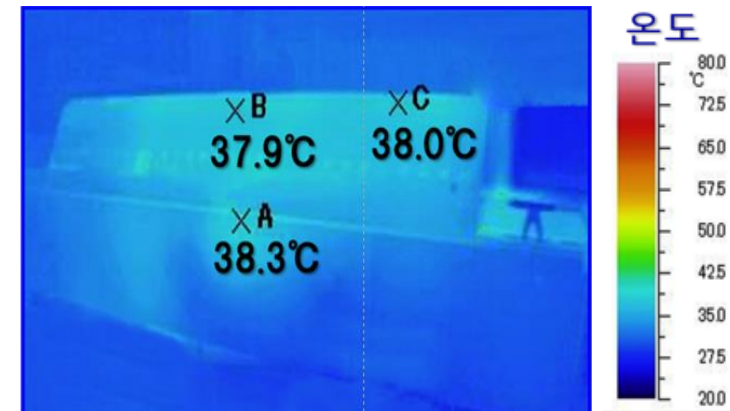
**Dramatically decreased Void**



## Ultra Energy Saving Structure



30KWh Start-up, 9 KWh Operation  
Industry's Best Power Consumption



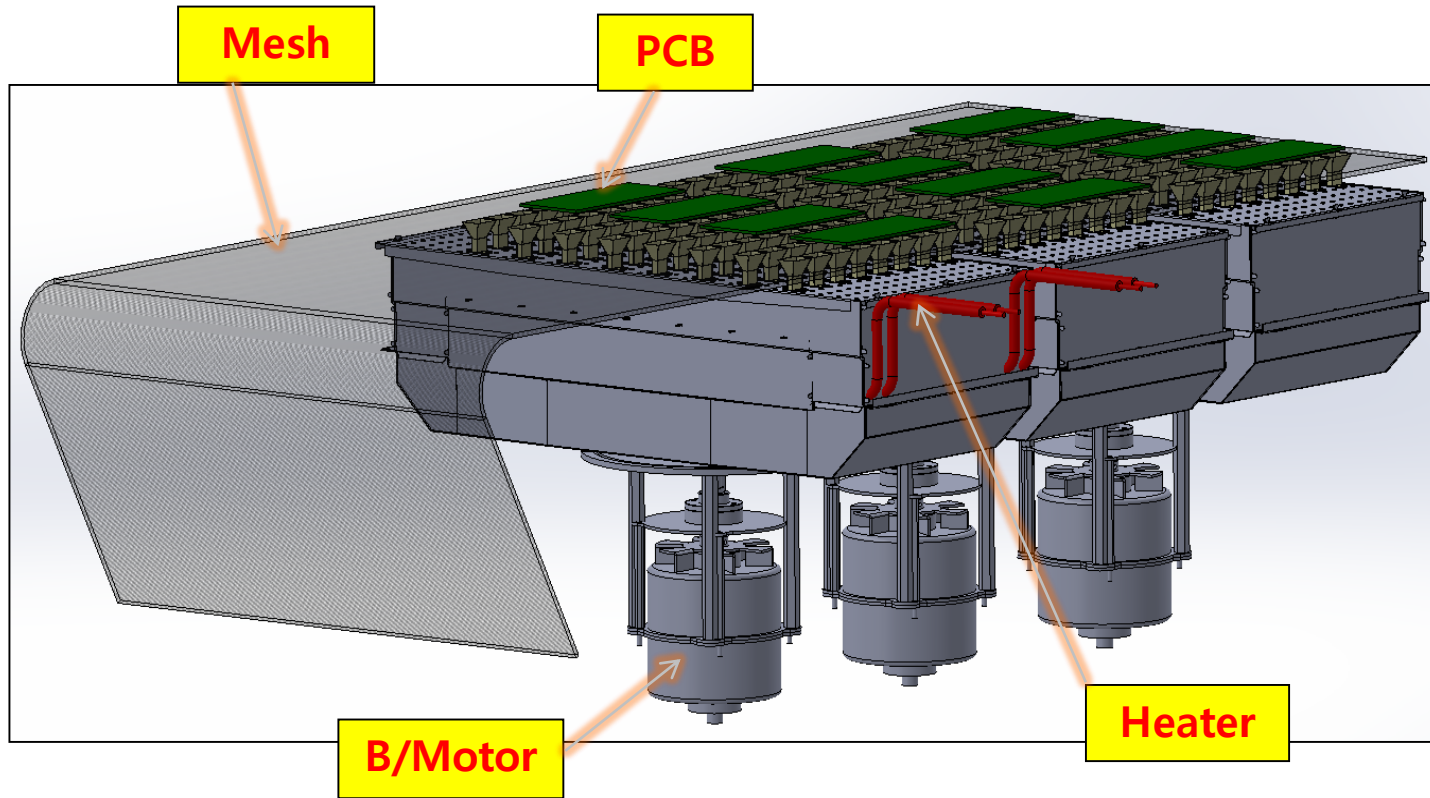
Super Excellent Heat Insulation Structure  
Low Energy Consumption and CO2 emission

## OPTIMUM REFLOW SOLUTION FOR SEMI-CONDUCTOR PRODUCTION

- Best designed for Flip Chip process
- Innovative Jig-less process ensures significant cost saving
- Remarkable improvement of failure rate
- Patent-protected Suction Process – **Only TSM !!!**



# SUCTION REFLOW



- Optimum **Mesh Flatness** for Flip Chip Bonding Process
- Suction level Control & Monitoring System **for Individual Zone** Level
- **SMEMA** Interface
- **JIG-LESS** Structure



## BEST PRACTICE & PROVEN REFERENCE !

CUSTOMER : S\* ELECTRONICS  
 PROCESS : FLIPCHIP BONDING

Application	BEFORE	AFTER	BENEFIT
LSI	Jig	Bare PCB	NO JIG COST ✓
			LOW COLD SOLDERING ✓
Memory	Bare PCB	Bare PCB	60% REDUCTION OF FAILURE RATE ✓



## ESP Series

### New Generation PSA Nitrogen Generator

- Easily Used and Intuitively understood by GUI (Graphic User Interface)
- Compact Design for effective space management
- Easy installation & relocation
- Lowest Noise suitable for indoor use
- Simple control of O2 purity through intuitive touch panel
- Operation interlocked with TSM reflow oven

<p><b>Sync to TSM Reflow</b> The MMI of TSM Reflow oven can interface to ESP N2 generator and control ESP, which can lead to saving of the energy consumption.</p>	<p><b>Easy Touch Panel</b> Touch panel enhances User Friendliness in the operation.</p>	<p><b>N2 Purity Control</b> N2 purity can be set by ppm unit and Swing Time can be controlled/</p>	<p><b>N2 Flow Control</b> The electronic Valve allows the operator to control the flow amount and minimizes the flow fluctuation by pressure difference.</p>





Proven Solutions for Reflow Soldering System

[sales@tsms.kr](mailto:sales@tsms.kr)

[www.tsms.kr](http://www.tsms.kr)