www.tsms.kr



## TSM ECONOLOGY

Please experience the next generation reflow which takes measures effectively against the CO<sub>2</sub> regulation, which has been further upgraded through the addition of full line–up of N<sub>2</sub> gas system supplying high purity and low dew point N<sub>2</sub> gas stably by realizing the lowest power and N<sub>2</sub> consumption.







Please scan the QR code using a smart phone.

# Reflow Full Line-up System



#### 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)



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



Appliances, etc.

Transformation of the second s



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



Suction Reflow (Semiconductor Reflow) Flip chip / Bonding Package



N2 GENERATOR Supplies high purity N2 gas to the N2 Reflow stably



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

# **Features** of Reflow



#### Convenient $(\Sigma)$ Screen Configuration

Provides the convenience of user access and reading by splitting the MMI  $\leftrightarrow \mathsf{RTPM}$ ↔ Rppm programs for the user interface into three screens on a wide monitor.



#### Rppm / Option

The real time O2 concentration profile system, Rppm, provides the ppm information of each zone by measuring the purity of oxygen inside the oven in real time and maintains the N2 atmosphere constantly by measuring it repeatedly.



 $(\Sigma)$ 

#### N2 Flow Control System Energy Saving System The user can innovatively save the power consumption compared to that of existing reflow equipment by upgrading the technology for uniform ppm control of entire zones which, something TSM is proud of. In addition, it is possible to perform automatic flow rate control according to the ppm setup.



regardless of the set pom by

consuming N2 quantitatively

\*\*\*\*\*\*\*\*\*\*\*\*\*\*

The N2 flow control method allows as

to maintain the ppm inside the reflow

control methods, energy loss occurs

oven. (In the case of existing O2 flow

much N2 to be consumed as is needed

Power Consumption at Idling State The N70-e series model, developed ourselves, reduces power consumption significantly compared to other existing



Realizes highly accurate O2 concentration

through automatic control of the O<sub>2</sub> concentration. (Uniform control of entire

0.5 1.0 1.5 2.0(hr) Multi-stage Control (N70-e93M)

III (Constanting

O2 Control System

zones)

Partial Start Up Mode Minimizes the peak power consumption by controlling the heater temperature in two steps It is possible to reduce the contract power capacity and save basic power costs



#### Dual Conveyor / Option

Dual Lane (Option) - Increased productivity (Compared to existing single lane systems) - Maximized extendibility and convenience → applicable to the maximum width of a dual lane system: 400mm Fixed axis to be arranged according to customers' needs → FMMF/ FMFM (F: fixed, M: movable)



The real time temperature profile system

further provides a variety of information as

well as a process index and chart data for

the analysis of compatibility and process

RTPM, which has evolved one step

RTPM / Option

capability

#### Special Heater / Option The special panel heater developed by TSM exhibits outstanding thermal efficiency and profile reproducibility by utilizing the radiant heat and existing convection current generated from the panel itself



#### Built-in PSA / Option Built-in PSAs interlocked with a reflow allow innovative use of space and provide users with a stable operation environment by performing precise PC control of large capacity PSAs supplying high purity nitrogen



Surface Temperature The reflow is insulated so that its surface temperature will have little influence on operators and the HVAC system, resulting in low power consumption.

# Line (for Smart phone) Max. 100 lines (for Server PC) 100

STMS(TSM reflow Mobile / Server Monitoring Service) / option • It is possible to check the reflow operation





#### S FMS(Flux Management System)

- Exhibits highly efficient flux recovery and reduces contaminants by applying a new flux collection device.
- Extended PM cycle and improved maintainability
- Equipped with a system for quick replacement of the collection device (for docking)

# Reflow of the future that everybody has dreamed of

have evolved one step further.

- costs significantly compared to existing systems.
- and operation system allows easy access and reading.
- measuring device and displays the ppm of entire zones by graph.
- through a single interface.
- arranged at the front for effective inspection and maintenance.
- contamination.

**Effective for energy saving** by minimizing the change in the internal temperature and reducing power loss by insulating the reflow to optimize thermal efficiency.

Allows the O<sub>2</sub> concentration to be easily converted selectively by standard by applying N<sub>2</sub> flow control interlocked with the PSA. The ESP adjusts the supply of the amount of generated N2 as much as the amount of N<sub>2</sub> consumed in the oven to reduce the operation of the air compressor, saving the power

Upgraded the technology for uniform ppm control of entire zones. It is possible to maintain the ppm with the balance using the pressure difference by only injecting a minimum amount of N2 after shutting offthe inflow of air at the inlet and outlet and sealing the inside of the oven completely.

Allows multi-tasking with 3 split screens on a wide monitor. Easy and convenient screen configuration

 The MMI screen which is configured focusing on the convenience of the user provides a temperature monitoring function, an alarm against operation and maintenance cvcles, calibration of the temperature meter and  $O_2$  meter, as well as a help function that displays the manual necessary for the execution of the program.

 The RPPM (Real Time O<sub>2</sub> PPM Profile Monitoring) for which TSM acquired a patent can monitor the status of the O<sub>2</sub> ppm in real time inside the reflow without requiring the purchase of a separate profile

TSM's WL-RTPM (Real Time Temperature Profile Monitoring solved the problem of the defect of existing sensor methods and problems due to foreign materials. Interlocked with the T-Profiler developed by TSM itself, it can perform real time temperature profiling and make SPEC IN/OUT judgment simultaneously.

 All programs (MMI, RTPM and RPPM) were developed by TSM by optimizing them for its reflow. It allows integrated management of all information related to the reflow by providing it to the customers' server

The large capacity FMS optimized for the characteristics of the reflow increases the cleaning interval by collecting the flux efficiently and reduces the down time of the reflow by applying a one touchdocking method and increases the customers' productivity by reducing the PM time.

 With its cutting edge ESP that supplies a large quantity of high quality nitrogen built into the reflow, it expands the customers' work space, ensures stable operation and economic benefits of cost saving by controlling the ESP precisely with the PC of the reflow. In addition, components are

 Partial Startup that performs multi-stage control of the heater reduces the basic power cost by minimizing the startup power to reduce the contract power and can reserve the date and time to start the reflow by using the weekly timer, thus further increasing work efficiency.

Its new design maximizes the functionality of the reflow and adopts a structure to maintain the internal temperature of the oven stably and while maximizing the flux discharge. In addition, it secures the space for maintenance at the inlet and outlet sides and **applies color and paint with a low discoloration rate** and

The new, special IR+hot air blow heating type heater system satisfies thermal efficiency and performance unlike existing hot air blow heating methods that heat heaters and use a convex current by controlling it with a motor. It maintains  $\Delta$ t even at low wind speed owing to its outstanding thermal conductivity. In addition, since it is designed to have high thermal efficiency, heat is transferreddirectly to the base metal, which improves soldering quality. It is suitable for micro pattern processes.

# N<sub>2</sub> REFLOW TRN - e SERIES

Automatic  $N_2$  flow control according to the ppm setup Applies an advanced energy saving system

AUTIO



TRN 🗆 – e 🗆 🗆 – P [PSA built in Type]



TRN 🗆 – e 🗆 🗆 – R [2 Flux Management System Type]

### The TRN series reflow developed by TSM through continuous innovation will give customers great satisfaction with its excellent functions and performance as a top model that realizes the econology and humanism for which TSM is aiming.

- The TRN series models features the best of the best in all aspects including energy saving, flux recovery capability, total solution, etc. TSM realized the lowest N2 consumption levels imaginable in its industry by applying a special a leading role in reducing N<sup>2</sup> consumption in the industry by continuously upgrading and focusing on N<sup>2</sup> consumption. Here, its newly developed N<sub>2</sub> flow control system supplies the minimum quantity of N<sub>2</sub> optimized to maintain the set ppm in the the electric parts of automobiles, heaters are installed at the inlet to which flux is mainly adsorbed and the exhaust outlet of the cooling zone in order to prevent flux from remaining and to allow the exhaust to be discharged smoothly. In addition, by allowing the one touch type FMS normally installed at the cooling zone to be installed additionally even in the preheating zone as an option, the flux recovery rate is maximized to allow customers to minimize defects and process management loss.
- Leads the reflow technology by applying a special heater of IR+hot air blow type. TSM's special heater, which combines the convection method that creates convective flow of hot air heated by the heater using a motor to the IR method that transfers the radiant heat of the panel with high thermal efficiency directly to the base metal, maintains dt even at low wind speed, allowing high quality soldering of micro patterns. In addition, it can realize a stable profile because there is little TSM's panel heater will lead the industry with a new reflow thatboasts both reasonable cost and quality.

### Incessant innovation toward the top soldering technology realized the best result.

- By applying the 2 FMS (Flux Management System), the TRN series reflows features the improved flux recovery capability, making its value the highest.
- Realizes energy savings by applying the advanced ESP series N2 generator that can automatically control the N flow rate.
- Leads the reflow technology by applying a special heater of IR+hot air blow type.
- the lowest discoloration rate which is not easily contaminated.

### Keep the inside of the oven clean! Leave it to the 2 FMS (Flux Management System)!

- Completely treats the flux carbonated gas generated during soldering by installing a flux management system (FMS) with high heat exchange capability lat the preheater (PH) zone and at the rear of the reflow (2 places). Protects the products from the flying flux generated during soldering by treating the flux gas into liquid state using
- outstanding radiator! Convenient maintenance! The radiator can be easily removed and installed by one touch, minimizing the workload required for maintenance.



Stand TRN II e9 TRN II ei TRN II e1 TRN II e TRN II es TRN II e1 TRN II e1 TRN II e1

structure that shields the inside of the oven as well as the system that controls the ppm of all zones uniformly. TSM has played oven with the ESP connected to the oven and thus reduces the air consumed in the ESP significantly, reducing the power cost of the air compressor to a great extent. In order to respond to the process that uses solder containing a large amount of flux for

deviation of flow velocity. In particular, while existing plate heaters have burdened customers significantly with their high cost,

• By applying a new design, it secures the space needed for maintenance at the inlet and outlet sides and adopts a color with

• The strong blower motor with triple sealing structure and specially structured duct do not allow leakage of any N2.

#### **TRN Model**

ard	PSA Embedid Type	$L \times W \times H(mm)$
3M	TRN II e93M-P	5,590 × 1,420 × 1,550
03M	TRN II e103M-P	5,900 × 1,420 × 1,550
23M	TRN II e123M-P	6,660 × 1,420 × 1,550
32M	TRN II e132M-P	6,660 × 1,420 × 1,550
2S		4,780 × 1,420 × 1,550
02S	TRN II e102S-P	5,050 × 1,420 × 1,550
03S	TRN II e103S-P	5,370 × 1,420 × 1,550
23S	TRN II e123S-P	$5,890 \times 1,420 \times 1,550$







CAUTION



Provides innovative solutions through energy savings

As an output for the achievement of highest performance and econology, the TRA series will satisfy both the economic efficiency and practicality of your business.

> • TSM, which performs technical development continuously, realized ultra-low power consumption for the eduction of CO<sub>2</sub> emissions in order to realize the econology, the keyword of the TRA series reflows.

The partial start-up which performs the multi-stage control of heaters reduces the contracted receiving power and basic power cost by minimizing the start-up power. It also increases production efficiency by utilizing the weekly timer function which allows reservation of machine operation date and time.

In addition, in order to respond to the placement characteristics of various boards, heating efficiency is maximized by multiplying the heating zones and applying a new nozzle structure with improved air flow resistance. It also realizes the best quality by applying an advanced ultra-uniform temperature control system to realize the lowest temperature deviation. The TRA series reflows ensures efficient production of products by applying uniform heating from above and below as well as variable heating from above and below separately. The MMI screen configured for user convenience provides a temperature monitoring function, an alarm for operation and maintenance, a temperature calibration gage, and a help function for program operation, thereby maximizing user convenience for access and reading.

> The RTPM(op), a real time temperature profile monitoring system, provides a variety of information as well as the process index and chart data for the analysis of compatibility and process capability.



al of flux in

### Why should you use TSM's reflow?

System configuration with outstanding durability Reliable quality

- Energy saving insulation structure
  - Blower motor with triple sealing
- Reliable follow-up management



The TRA series reflows are an innovative design that ensures efficient flux discharge as well as highly efficient thermal management





f102s : L 4.430 X W 1.420X H 1.550mm / f103 : L 5.010 X W 1.420X H 1.550mm f123 : L 5.630 X W 1.420X H 1.550mm

PSA N<sub>2</sub> Generator

# **ESP - SERIES**

It is possible to freely set the purity and consumption of O2 hrough the GUI (Graphic User Interface).



- outstanding energy savings since it can be controlled by ppm. • Possible to freely set the purity and consumption of N2 through the GUI (Graphic User Interface).
- Applies an innovative operation program that can check various data with a graphic chart.
- Improves manipulability and user convenience by applying a touch panel. • Minimizes variation of flow rate due to differential pressure by dopting an electronic valve.

-	-	
Sinteg Store	N2 Row	R Brite + Halt R + Halt
1234.5 sec	123 1/10	1234 % 🕥 1.23 bar
1234.5 MC		R: Noity - Linit R2 - Linit
EQ Time	MAINTENANCE	1234 % (0) 1.23 bar
12.3 sec		Air - Dait Pher - Dait
taking Delay Trave	SESTIN	1.23 bar (1) 1234 %
Vest Dolay Time	TUNING	Alf - Italt
12.3 800	_	1.23 bar (1) 1234 %

#### Operation Interlocked with TSM's Reflow Allows control operation from the reflow with the ESP being interlocked with our reflow operation program(MMI). The N<sub>2</sub> generator can be

controlled by changing the operation conditions by production model (ppm), thus allowing energy savings



Convenient Touch Panel User convenience has been improved further by applying a convenient touch panel.



N2 Purity Control It is possible to set the purity of produced nitrogen in the ppm unit and control the swing time selectively.



and PSA Interlocked Control of Reflow

Interlocked control of the reflow and PSA allows control by ppm, thus allowing outstanding energy savings.

Eco-friendly, low power consuming N<sup>2</sup> generator effectively responding to customers' needs

 $\mathbf{\Sigma}$ Low noise N<sup>2</sup> generator that can be easily moved and managed owing to its compact structure!

Compact Size	Moving PSA Type					
Possible to use space effectively owing to compact design.	Model	Capacity Nm³/Hr (99.99%)	Discharge Pressure (Mpa)	Air Compressor (kw)	Weight (kg)	Dimension L $\times$ W $\times$ H(mm)
Free Installation and	ESP-N12RT-99	12		11	730	1,560 × 520 × 1,260
Delegation	ESP-N15RT-99 15			810	1,560 × 520 × 1,360	
Relocation	ESP-N18RT-99	18	0.5	13	880	1,560 × 520 × 1,460
Possible to be freely moved by installing	ESP-N20RT-99	20		15	960	1,560 × 520 × 1,610
casters on all types of N2 generators and	ESP-N25RT-99	25		22	1,160	1,560 × 520 × 1,690
Low Noise Can be used indoors with no problem owing to low operational noise.	Air compressor Moving For	r : 7 kg/cm² C <b>E, China</b>				
	ESP-N12R-99	12		11	890	1,500 × 520 × 1,460
Convenient Manipulability	ESP-N15R-99	15	0.5		910	$1,500 \times 520 \times 1,460$
Operation and movement can be easily	ESP-N18R-99	18	0.0	13	1,000	1,680 × 520 × 1,458
managed and controlled with the display	ESP-N20R-99	20		15	1,100	1,860 × 520 × 1,460
panel. O2 purity is displayed.	* Air compresso	r:7 kg/cm²				

#### N2 Generator that supplies high purity nitrogen to the N2 reflow continuously and stably!

Easy Maintenance	▷ TP-Type PSA		
Allows easy maintenance by applying a	TP-N30R-99	30	
highly reliable solenoid valve.	TP-N40R-99	40	
0. 1	TP-N50R-99	50	
Simple	TP-N60R-99	60	
Can supply high purity nitrogen gas by	TP-N80R-99	80	
only supplying power.	TP-N100R-99	100	

а	TP-N30R-99	30	0.5	22	1,520	1,400 × 1,520 × 2,100
TP-N TP-N TP-N TP-N TP-N1 TP-N1	TP-N40R-99	40		30	1,830	1,450 × 1,600 × 2,300
	TP-N50R-99	50		07	2,340	1,500 × 1,750 × 2,400
	TP-N60R-99	60		37	2,610	1,650 × 1,850 × 2,600
	TP-N80R-99	80		55	3,100	1,800 × 2,050 × 2,800
	TP-N100R-99	100		75	3,200	1,850 × 1,700 × 3,000
	TP-N120R-99	120		90	3,400	1,950 × 1,800 × 3,200

Can supply high purity and low dew point N gas stably.

### **N2 GENERATOR**

#### Example of installation in a line

(N2 Generator(TPM - Type) + N2 Reflow Flow Diagram ) Air Filter
Air Filter
Air Filter
Adsorption Type Air Dryer O Air Com iver Tank



(N2 Generator(TP - Type) + N2 Reflow Flow Diagram )

Air Filter O Refrigerant Air Dry







Moving PSA Type

-	
	-
-	-

Moving For CE, China



TP – Type

No Reflow

Test Room







#### EQUIPMENT

		TRN-e	TRA-
Mechanism	Basic Sheath Heater	•	•
	Special Plate Heater		-
	Separable Blower Motor	•	-
	Triple Sealed Blower Motor	•	•
	Detachable FMS	•	-
	C/V chain + Center Support	•	•
	C/V chain + Mesh	<b></b>	
	Special Attachment Chain	•	•
	Mesh Belt Only Type	<b></b>	
Oracustica	Low Vibration Mesh Belt		
Operation	C/V chain + Two CenterSupport	<b></b>	
	C/V Width Semi Auto	•	•
	C/V Width Full Auto	<b></b>	
	Torque Limit (Overload Prevention)	•	•
	Dual Type (Simultaneous F/R Control)	<b></b>	
	Dual Type (Independent F/R Control)		<b>A</b>
	N2 Quick charge	<b></b>	_
	Cooling Zone Heater	<b></b>	
	RTPM	<b></b>	
	RPPM	<b></b>	-
	Watt Hour Meter	<b></b>	
	Integrated Flow Meter	<b></b>	-
	Detection Sensor of B/M Rotation	<b></b>	
Convenient	PSA Built in type	<b></b>	-
Function	ND System	•	-
	New MMI + ESP Interlock	•	-
	N2 Flow Rate Control	٠	-
	O2 Flow Control	-	-
	Bar Code Function		
	New UPS(Charge Indicator + Communication Function)	<b>A</b>	
	Digital Flow Meter		-
	SMEMA		
	CE		
Others	SECS/GEM		
	Dual Monitor		
	T-Profiler		
	• :Sta	ndard A:Option -	- :Not Applicable

Contact for Business Services and Purchasing

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