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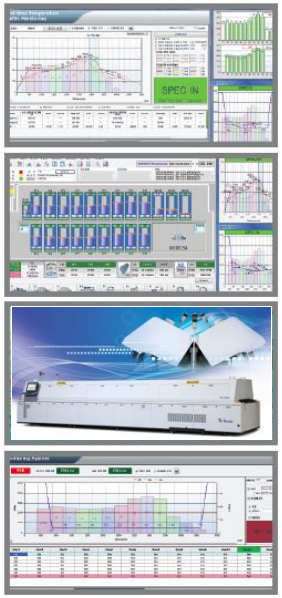
REFLOW

TSM ECONOLOGY

CO_2 환경규제에 효율적으로 대처한 초 저소비전력,
최저 질소(N) 소모량 실현, 안정적인 고순도, 저로점의 질소가스 공급
Full Line-Up 으로 더욱 향상된 차세대 Reflow를 만나보십시오.



☞subject to be changed without prior notice

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Reflow Oven
Dual & Twin
Serie

Energy Saving
Low Maintenance

INDEX

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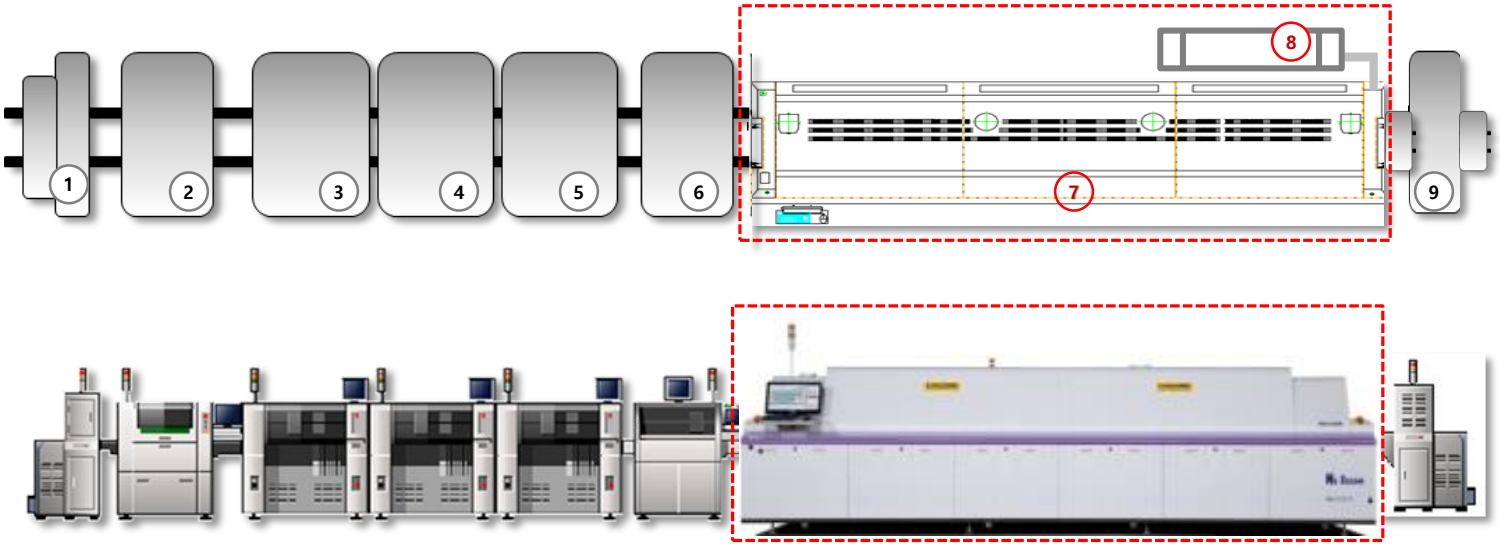
1. SMT LINE Configuration (External PSA)



N70-e Series Reflow

Is developed to realize ultra low energy consumption following environment policy of TSM.

① Loader
② Screen Printer
③ Chip Mounter
④ Chip Mounter
⑤ Chip Mounter
⑥ Pre-Reflow AOI
⑦ REFLOW
⑧ PSA : N2 Generator
⑨ Un-Loader

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■ Comparison between Dual & Twin

	Dual	Twin
Appearance		
Features	Single Reflow Two lanes with same reflow profile	Double Reflow Two lanes with different reflow profile
Control PC	1 PC	2 PC
PCB Width	50~250mm / 50~250mm (max. 340mm)	50~250mm / 50~250mm (max. 300mm)
Advantage	Higher productivity Can be used as single lane for big board	Higher productivity Independent operation Space saving Flexibility

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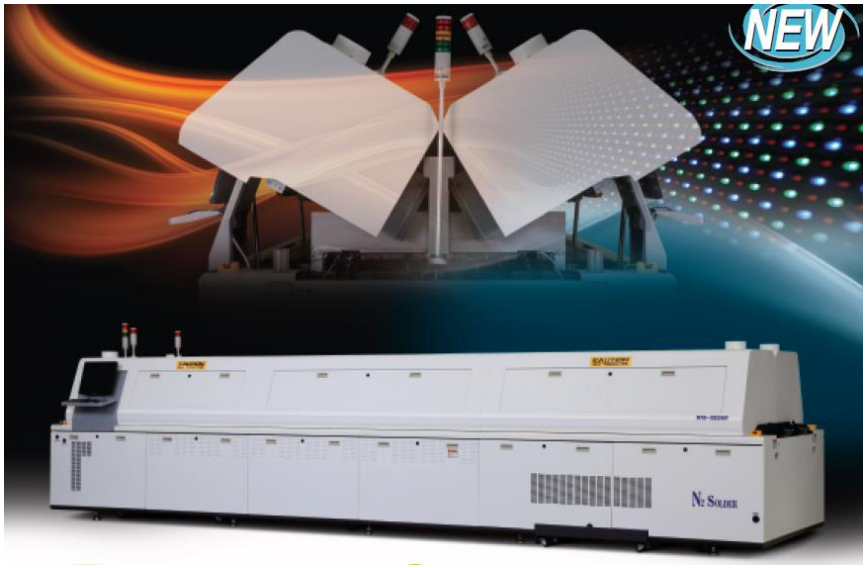
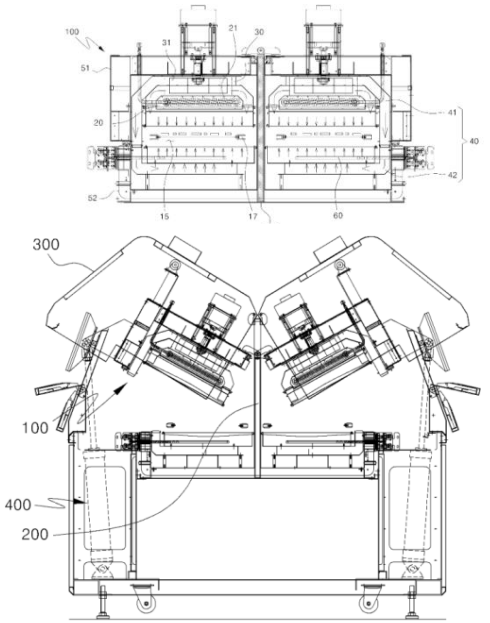
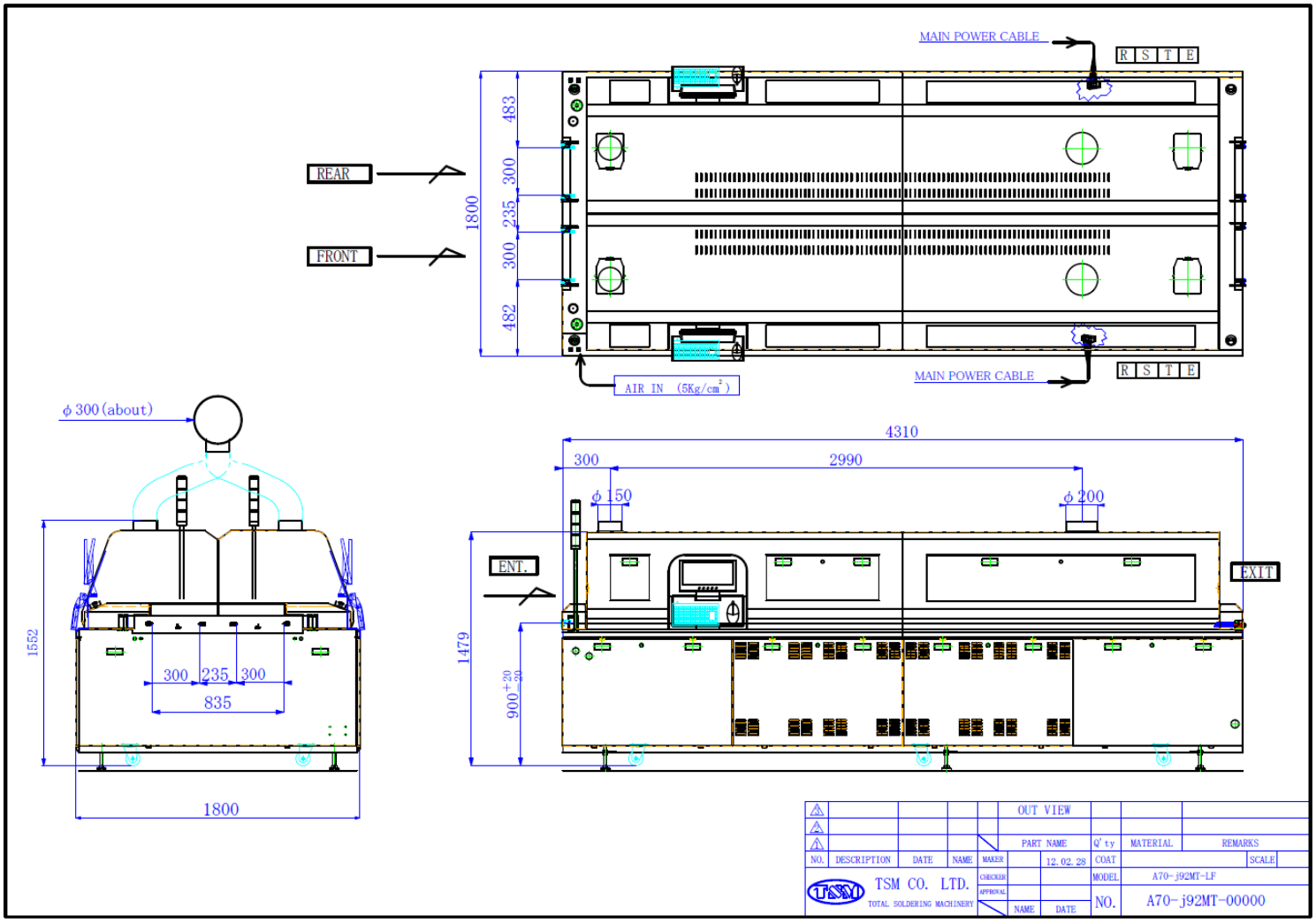
■ TWIN structure (TSM patent : 10-1268319 2013.5.22)





■ Outer Dimension (example : 9 Zone TWIN)



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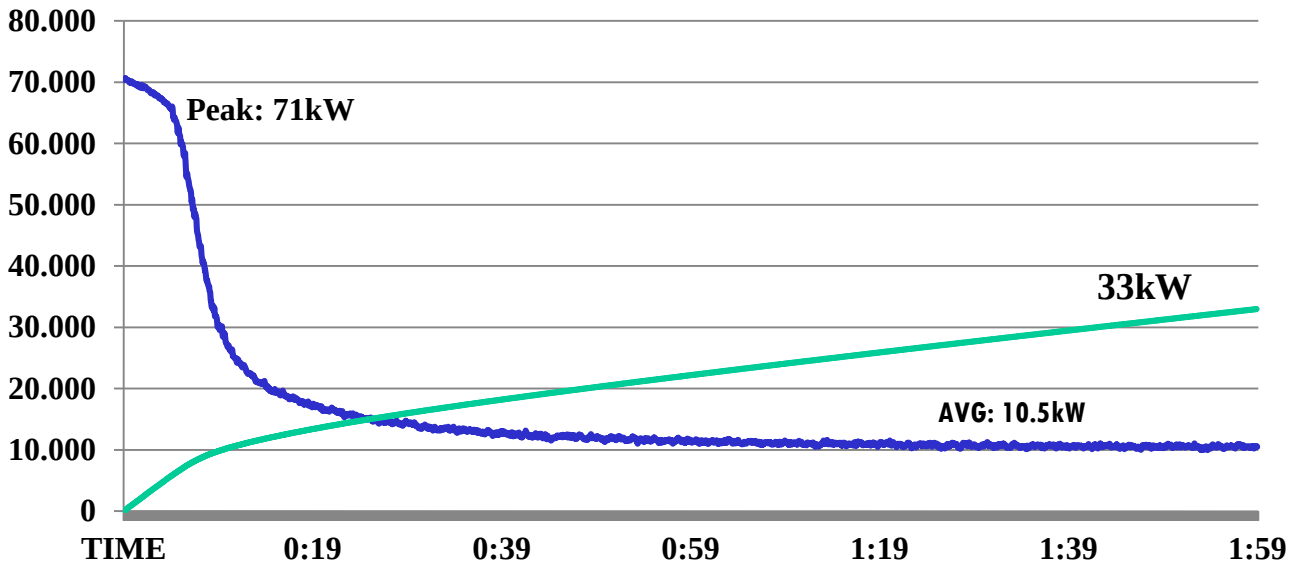
2. Key Technologies

- Ultra Energy Saving
- lowest N_2 consumption and even ppm level control for all zones
- MMI Display in 3 parts
- User-friendly Display Menu
- Rppm (Real time O_2 ppm Profile Monitoring)
- RTPM (Real time Temperature Profile Monitoring System)
- Single Interface of database with customer server
- FMS(Flux Management System)

2. Key Technologies

■ Ultra Energy Saving(I)

Realize stable temp profile even with the lowest power consumption



※Power consumption is accumulated for 2 hours including start-up power.

◈ Insulation to be able to optimize heat efficiency

◈ decrease loss of energy by minimizing change of temperature inside oven

◈ 10.5kW when stabilized (based on standard N70-e93M)

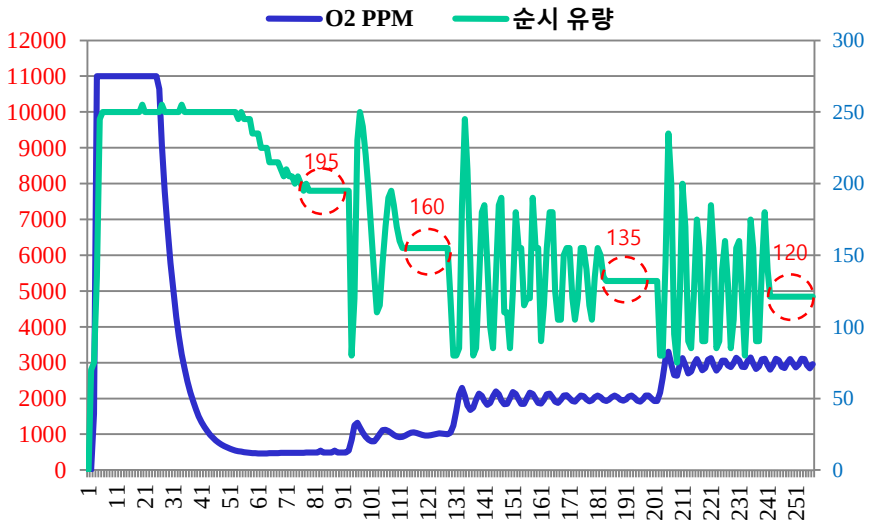
2. Key Technologies

■ Ultra Energy Saving(II)

Reduce dramatically N_2 consumption by ppm control through N_2 flow rate method

Set ppm		500ppm	1,000ppm	2,000ppm	3,000ppm
avg. N_2 Flow rate per set ppm (L/min)	O_2 flow rate method	220	220	220	220
	N_2 flow rate method	**195**	**160**	**135**	**120**
	reduction ratio	**11.4%**	**27.3%**	**38.6%**	**45.5%**

Based on TRN-e93M



◈ **Minimized N_2 consumption to keep set ppm in Reflow through N_2 flow rate method**

(O_2 flow rate method causes energy loss by consuming equal quantitative N_2 regardless set ppm)

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2. Key Technologies

■ Ultra Energy Saving(III)

Reduce power consumption of air compressor through synchronized PSA

N_2 flow rate method		Test 1	Test 2	Test 4	Test 5
REFLOW	ppm set (SV)	500	1,000	2,000	3,000
	ppm measure (PV)	500ppm±20%	1000ppm±20%	2000ppm±20%	3000ppm±20%
	avg. N2 flow rate (L/min)	195	160	135	120
PSA	Purity (ppm)	40	100	150	170
	Swing Time(Sec)	60	120	140	160
	PSA Air consumption(L/H)	133,000	78,300	70,000	64,500
Consumption (kwh) of air comp (20Hp)		15	9	8	7
Energy saving (%) – vs 500ppm		-	41	47	52

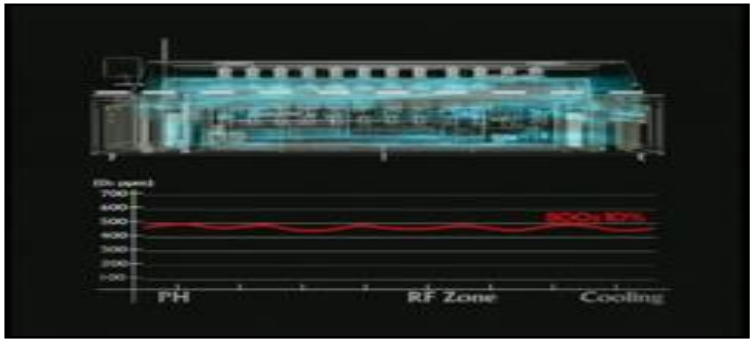
◈ It's possible to change O_2 ppm setting easily. ESP supplies N_2 to Reflow as much as consumed in Reflow and it make air compressor run much less, which results in saving energy cost.

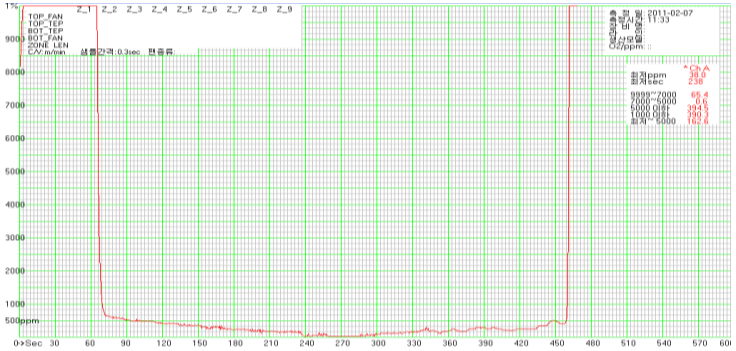
(O_2 flow rate method causes energy loss by generating and supplying equal quantitative N_2 at maximum regardless set ppm)

2. Key Technologies

■ lowest N_2 consumption and even ppm level control for all zones

maintain ppm for all zones with minimum N_2 consumption



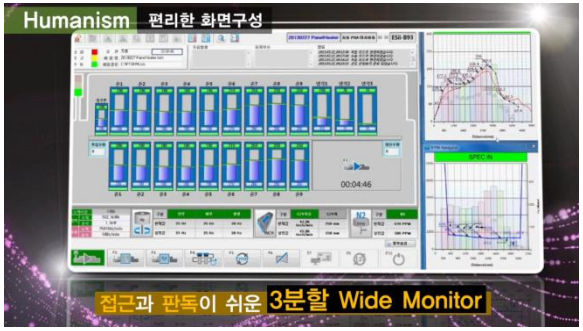


Option

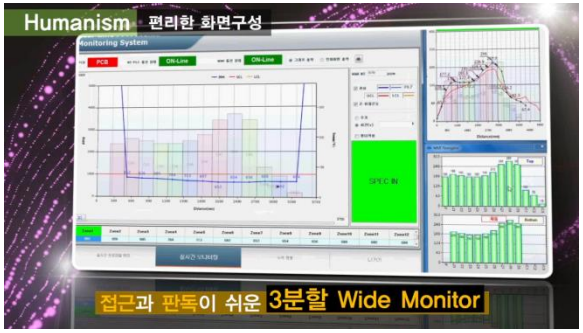
- ◈ automatic control system of N_2 flow rate
- ◈ keep ppm through balance using different pressure with minimum N_2 supply by upgraded All Zones Even Ppm Control System
- ◈ anti hunting by completely closed oven structure (N_2 goes out only through entrance and exit conveyor)
- ◈ block air input from entrance and exit by special curtain
- ◈ PID method
  automatic ppm control System, Full close loop Control
- ◈ separate digital panel for even ppm control system
- ◈ stable operation at lower N_2 pressure (4bar)

2. Key Technologies

■ MMI Display in 3 parts (Reflow MMI, RTPM, RPPM)



MMI



RPPM

RTPM

- ◈ enable Multi tasking of 3 functions
- ◈ easy monitoring and access to programs through user-friendly screen and menu
- ◈ real time process control on single screen by advanced RTPM and RPPM

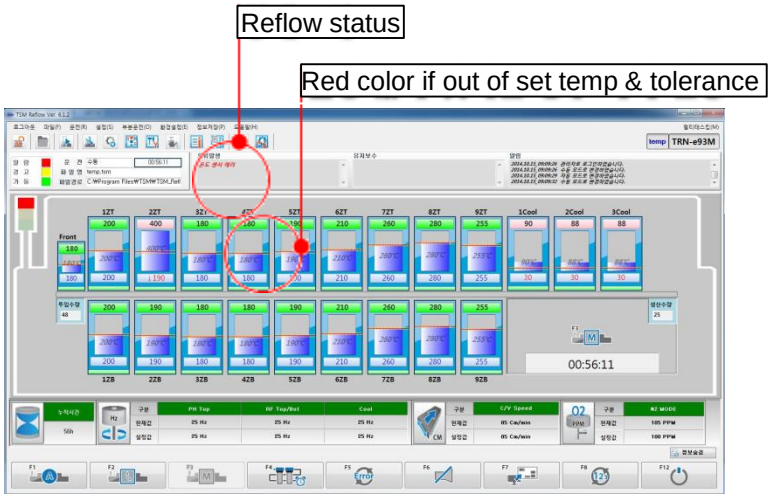
2. Key Technologies

■ User-friendly MMI (I)

▣ Temp monitoring

◈ Graphic display of Reflow temp & change to green if reached to set temperature

◈ If out of set temp & tolerance, changing color to red and alarm (display tolerance in specification)



▣ Maintenance alarm

◈ Define maintenance plan by user & give message and alarm on time for each factor

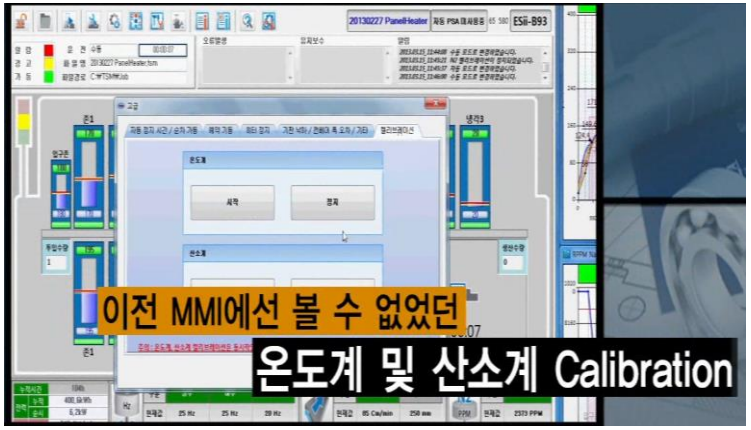
◈ Configurable up to 10 messages (easy management of maintenance cycle)

2. Key Technologies

■ User-friendly MMI (II)

▣ Calibration

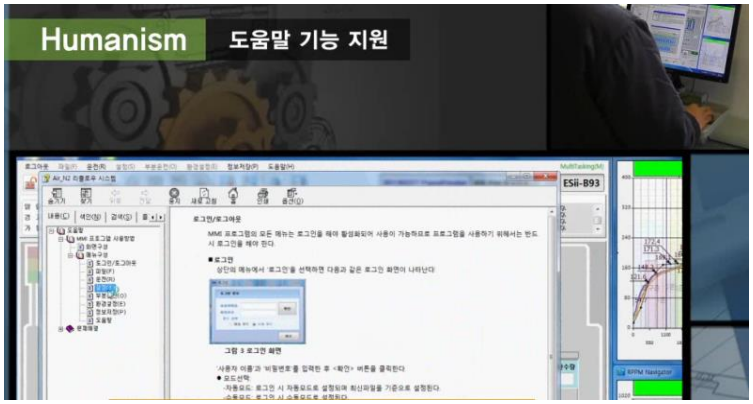
◈ Auto Calibration of thermometer and oximeter (for N2 Reflow)



▣ Help menu

◈ Quick guide from help menu

◈ Easy access to manual for operation of Reflow

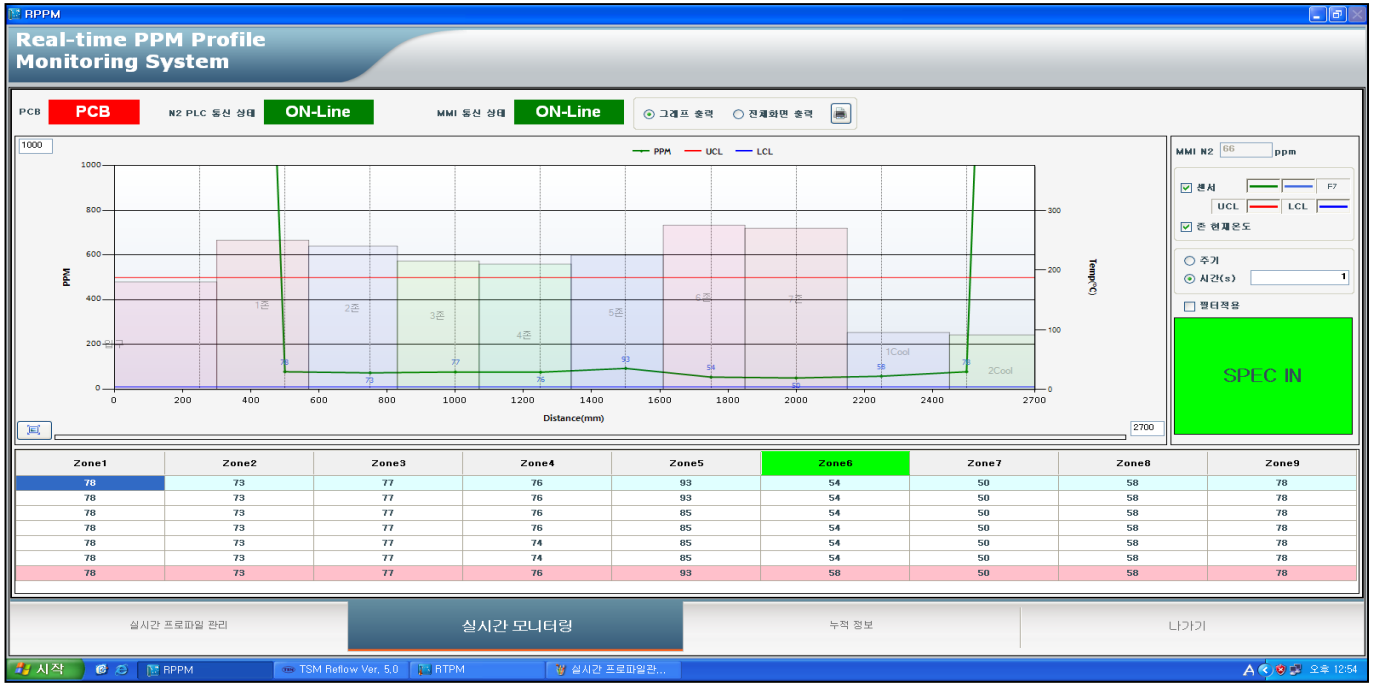


2. Key Technologies

■ Rppm (Real time O_2 ppm Profile Monitoring) Option

TSM Patent : 10-1213641

Provide real time O_2 ppm for all zones



- ◈ Monitoring O_2 ppm of Reflow in real time without additional ppm measuring equipment
- ◈ No need O_2 ppm profile on model change -> reduce loss of production time
- ◈ Possible to analyze based on product and time -> O_2 Profile graph, database & spec
- ◈ Improve soldering quality by keeping even O_2 ppm level
- ◈ Check ppm for all zones using one O_2 Analyzer in a short time (possible to set cycle time)

2. Key Technologies

■ RTPM (Real time temperature profile monitoring system I)

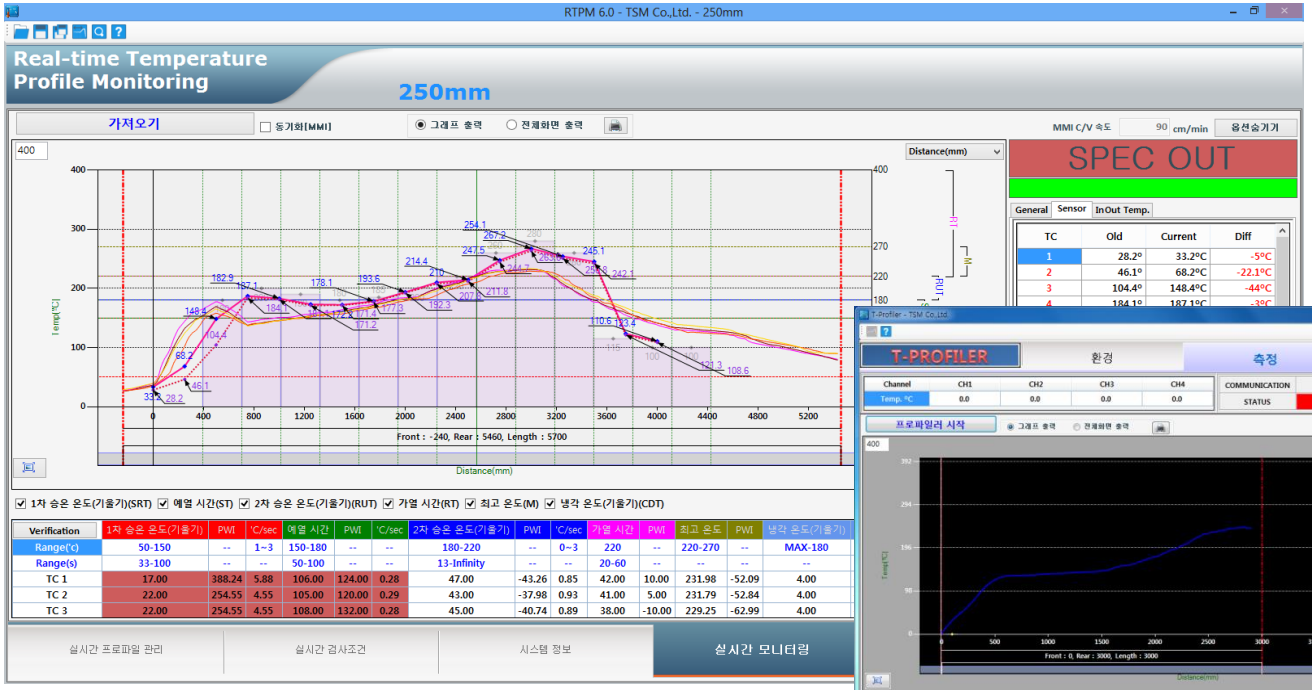
Monitoring real time temperature of all zones

Solution is RTPM

◈ realize stable quality through real time management

2. Key Technologies

■ RTPM (linked with T-Profiler)



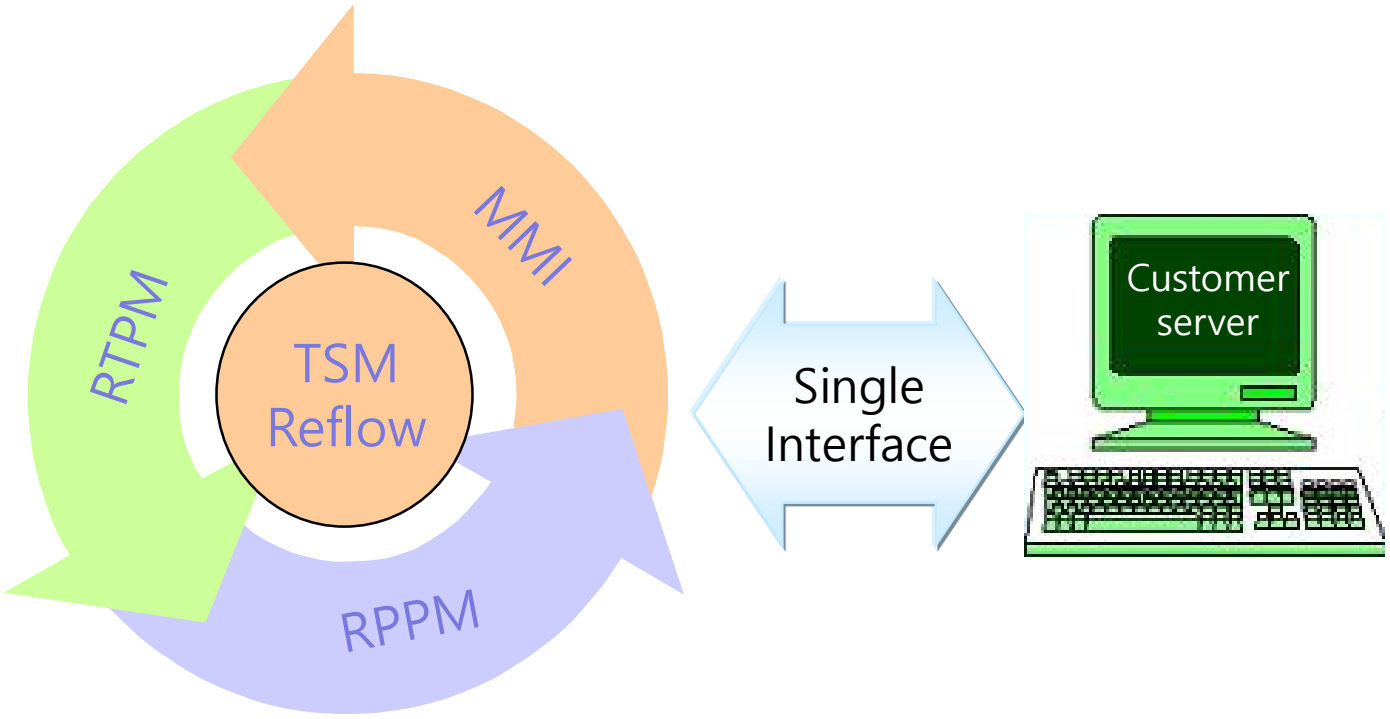
◈ profile memory for each board->Database
◈ archive Reflow operation data (standard every min.)
◈ check real time graph of Reflow temp ->Spec management
◈ no need profile on model change ->reduce loss of production
◈ Communication with customer host -> provide Reflow data
◈ linked with Reflow MMI -> feedback Temp & Alarm
◈ linked with T-Profiler developed by TSM

<T-Profiler>

◈ real time judgment of SPEC OK/NG during profile
◈ to be used to verify RTPM
◈ multi channel temp profile sensor(4CH)

2. Key Technologies

■ Single Interface of integrated data with customer server

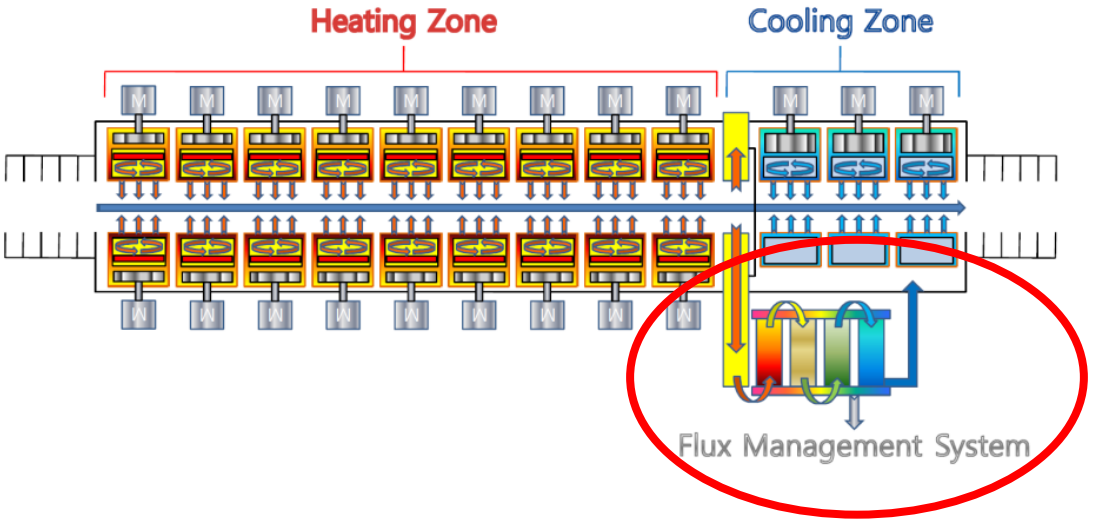


◈ **provide all information related to Reflow(RPPM, RTPM & Reflow operation status) to customer server through Single Interface for integrated management**

2. Key Technologies

■ FMS

Improve collection of flux by installation of high capable FMS



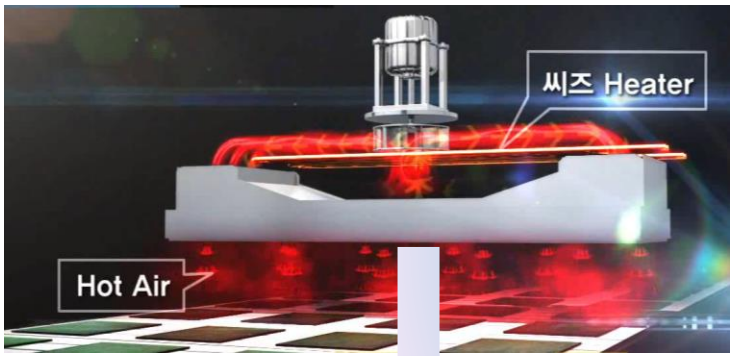
◈ High capable FMS optimized for TSM reflow collects flux efficiently and requires less cleaning

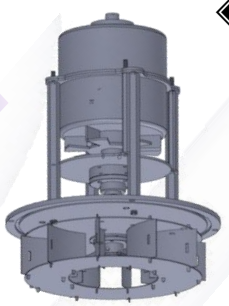
◈ FMS decreases flux dramatically, and it increases quality level

◈ Easily and quickly taking FMS out Reflow for maintenance and putting it back with One Touch Docking reduces time of machine stop for PM and increase productivity

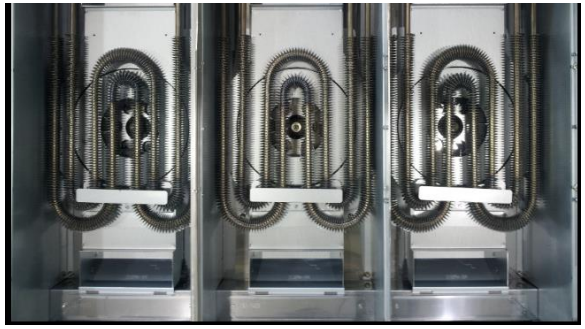
2. Key Technologies

■ high-powered and robust motor and special heater





◈ stable and high quality motor with high power of 300w/450w and strong torque has triple sealed structure and contributes keeping O_2 ppm with minimum N_2 consumption by preventing N_2 leakage loss

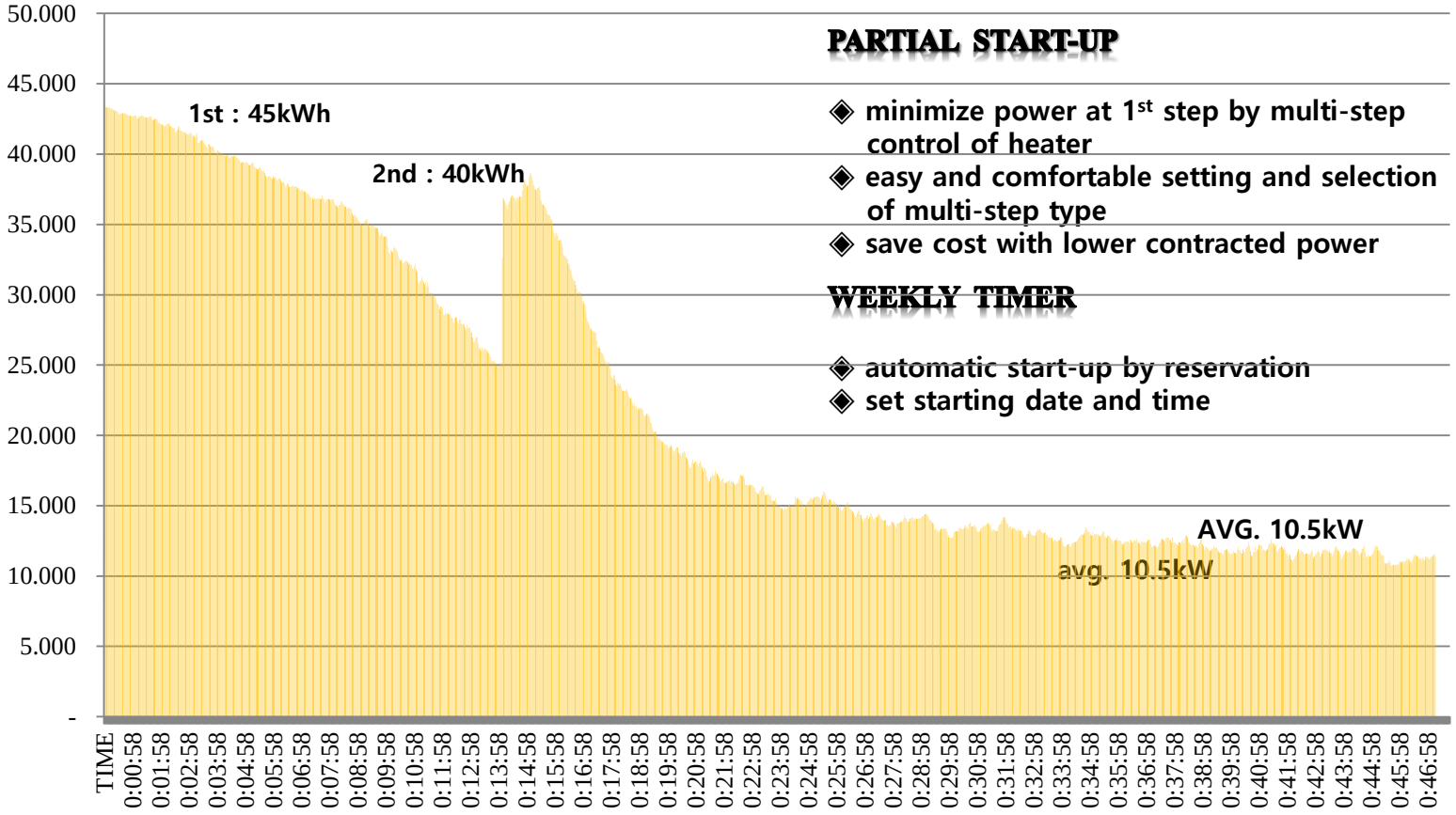


◈ special heater with high efficiency suitable for high temperature

◈ longer lifetime with strong durability compared to normal heater

3. Additional features

■ convenient & cost effective



PARTIAL START-UP

- ◈ minimize power at 1st step by multi-step control of heater
- ◈ easy and comfortable setting and selection of multi-step type
- ◈ save cost with lower contracted power

WEEKLY TIMER

- ◈ automatic start-up by reservation
- ◈ set starting date and time

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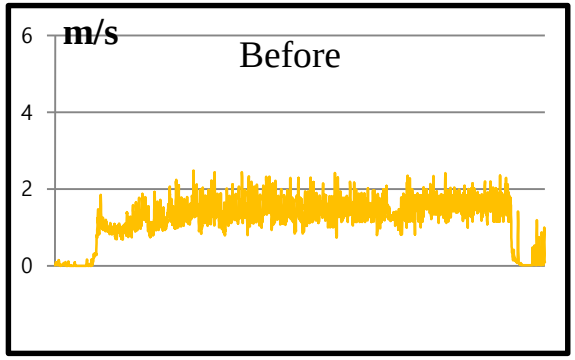
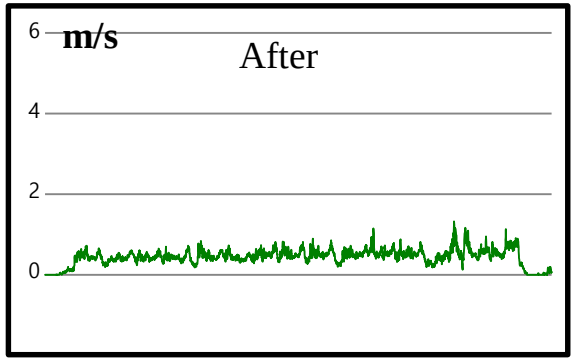
3. Additional features

■ stable profile at lower blowing speed





◈ even air speed at low motor rpm

◈ high quality soldering by lower blowing speed and less vibration

◈ suitable for fine pitch by minimum air speed (parts not blown off)

◈ stable profile because of less variation of air speed

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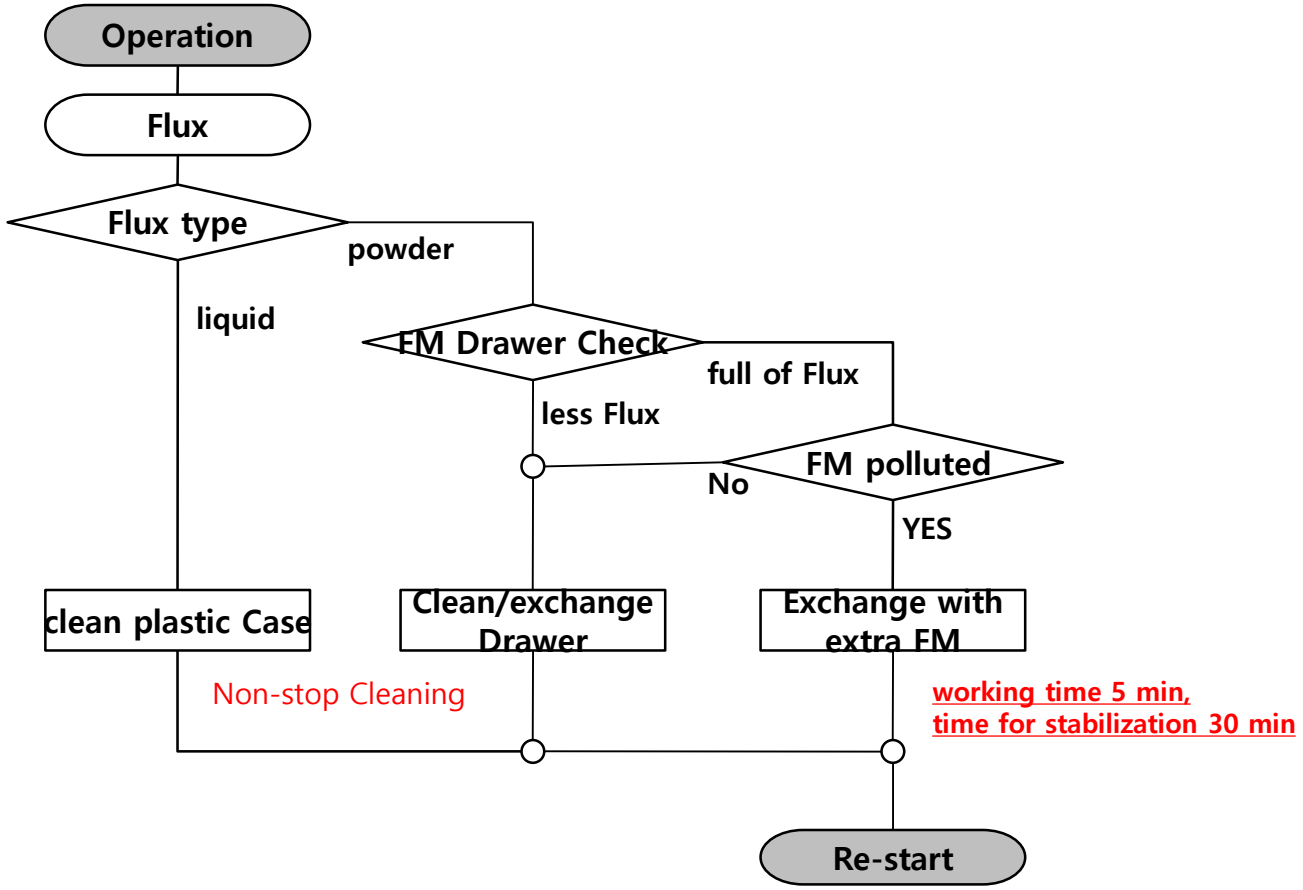
3. Additional features

■ Non-stop Cleaning System Process



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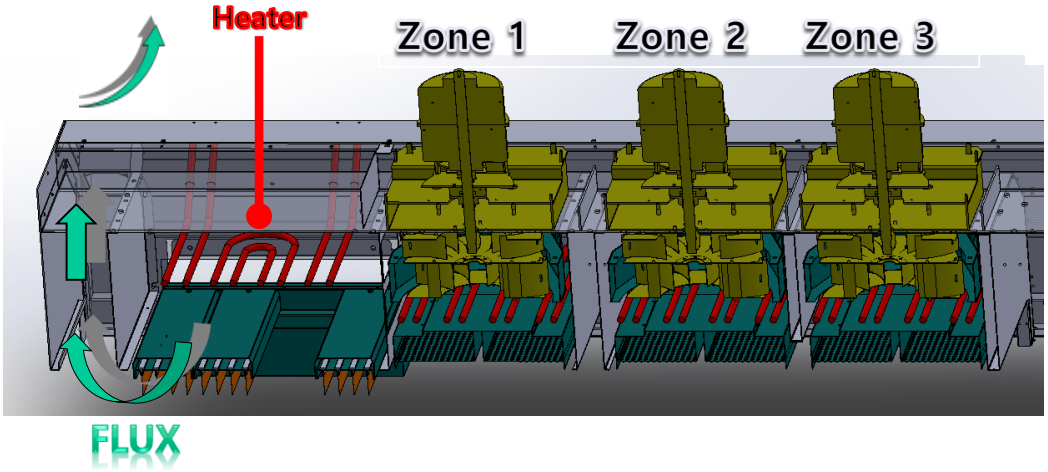
3. Additional features

■ prevent flux remaining at entrance



◈ attach Pre-heater over entrance curtain (controlled by independent controller)

◈ able to use as pre-heating zone

◈ improve ventilation of flux

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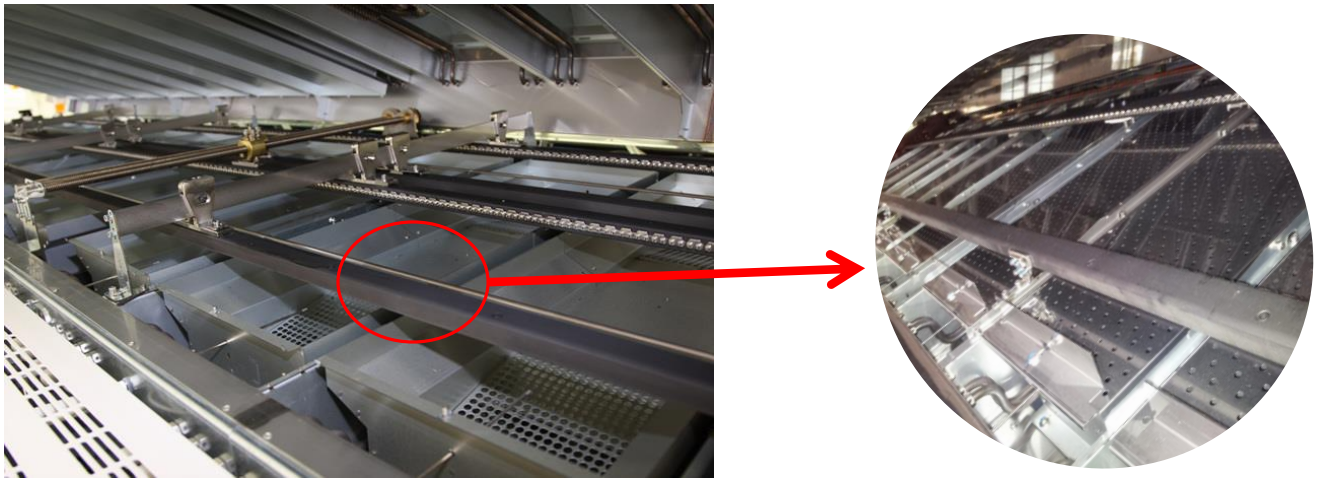
3. Additional features

■ lower temperature variation inside oven



◈ minimize influence of convection by small size of special heat-treated steel

◈ minimize ⊿t on PCB by narrow rail

◈ minimize deformation after long time operation by using rail for high temperature

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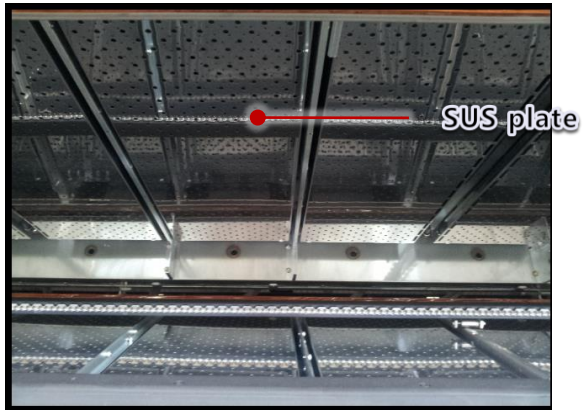
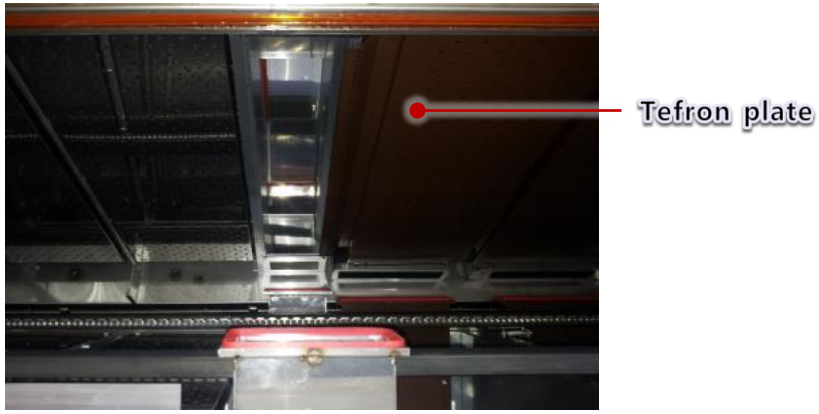
3. Additional features

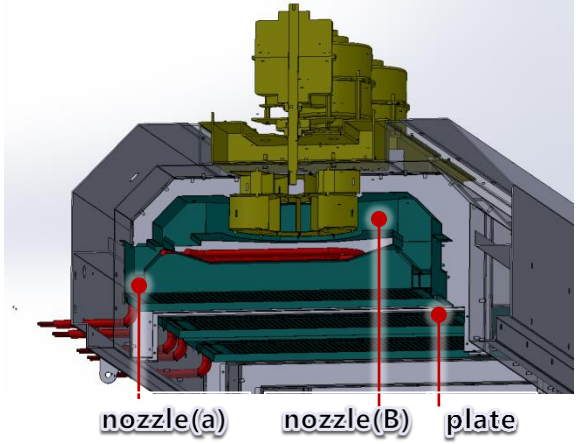
■ high quality soldering / anti-adsorption



Reflow zone



Cooling zone



◈ **anti-corrosion plate : SUS plate**

◈ **anti-adsorption and easy maintenance :**
Tefron coating plate

◈ **high quality soldering**
optimized hot air circulation structure for SMT

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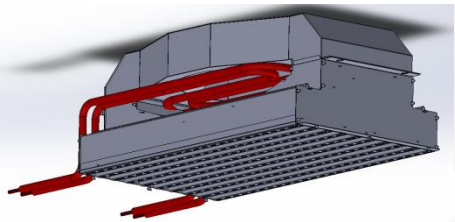
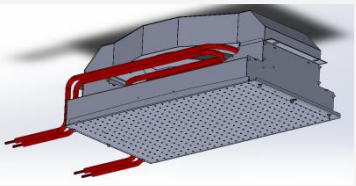
3. Additional features

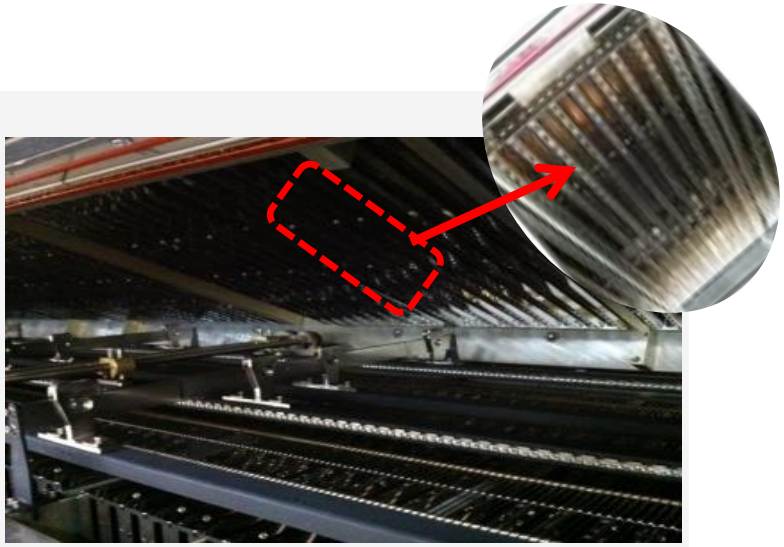
■ special customized nozzle Option



special customized
(Option)



normal



◈ achieve high quality soldering by providing special customized nozzle

◈ no corrosion by flux and easy maintenance on SUS plate

◈ no flux adsorption on Tefron plate

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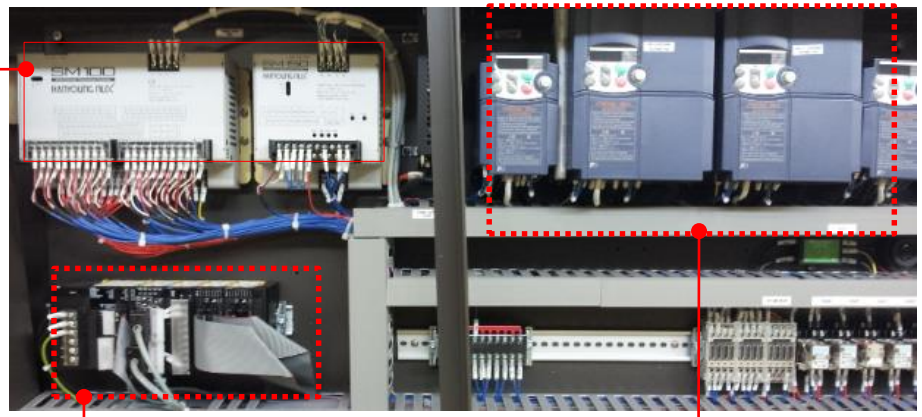
3. Additional features

■ stable control unit of high spec

Controller

◈ Auto tuning
◈ Sampling 50ms / time base PID control
◈ Individual SW Data Monitoring & Loading
(Loading Cable : option)



Omron PLC

◈ quick trouble shooting
◈ buy on open market for replacement
◈ high-end Maker PLC with high quality
◈ replace only damaged part among kit

Fuji Inverter

◈ control blowing speed by inverter on heating zone and cooling zone
◈ no blowing off problem for fine chip
◈ control speed of blow motor on PC MMI

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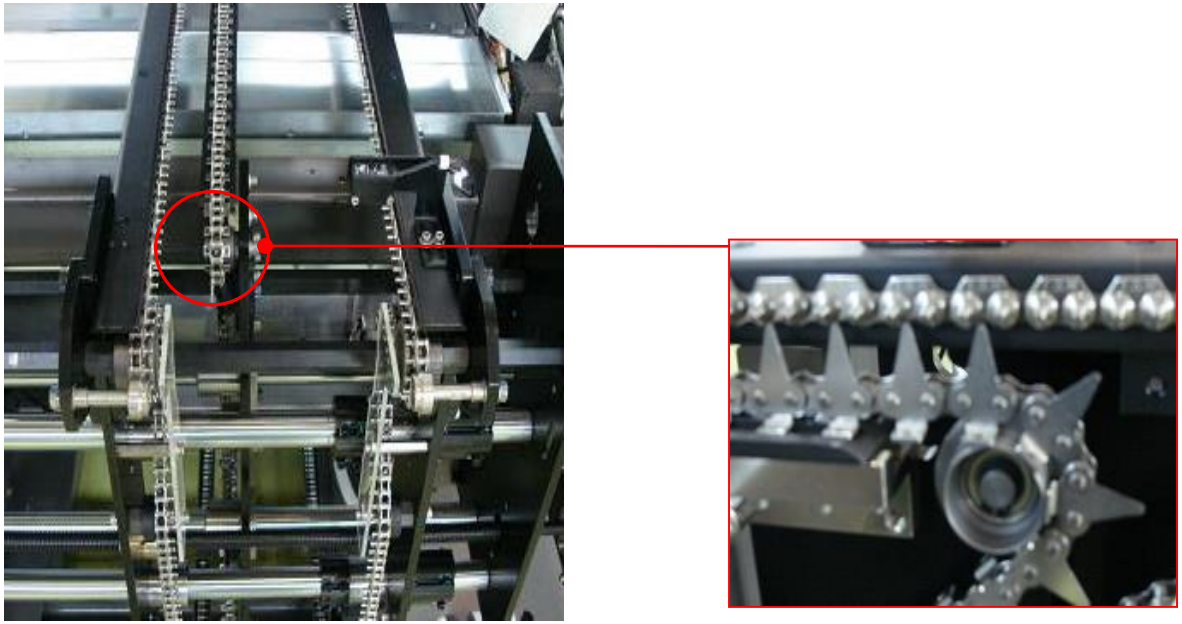
3. Additional features

■ minimize heat deflection



◈ Anti Warp conveyor is standard

◈ minimize that PCB Board is being bent by heat

◈ prevent drop of bent PCB inside oven

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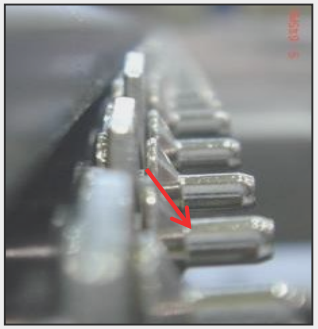
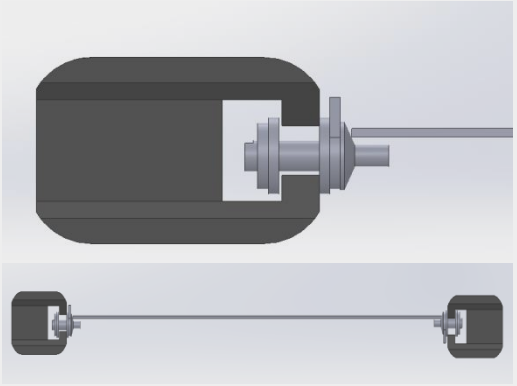
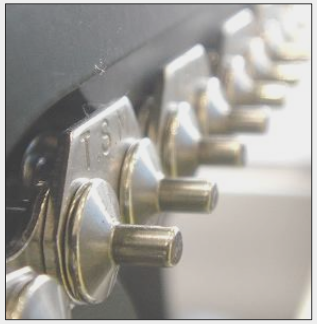
3. Additional features

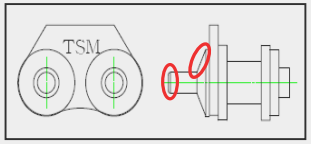
■ no PCB stuck

TSM(O)







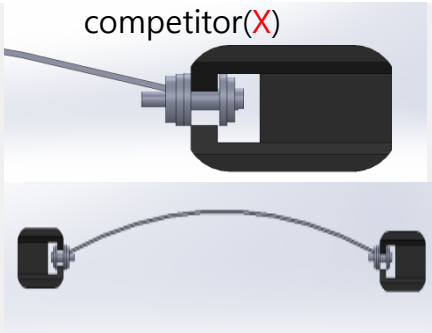


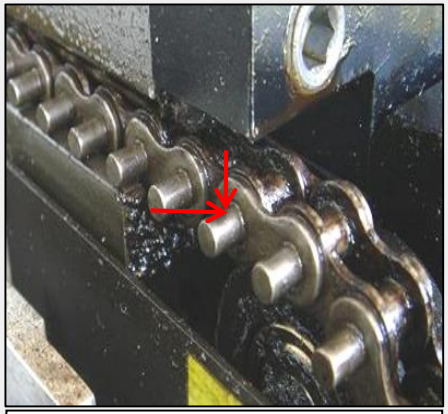
◈ **slope between Chain and Pin**

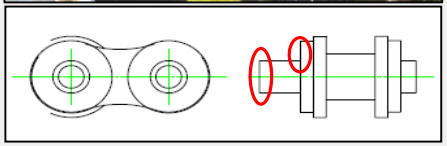
◈ **minimize PCB board stuck**

◈ **Self-alignment**

competitor(X)







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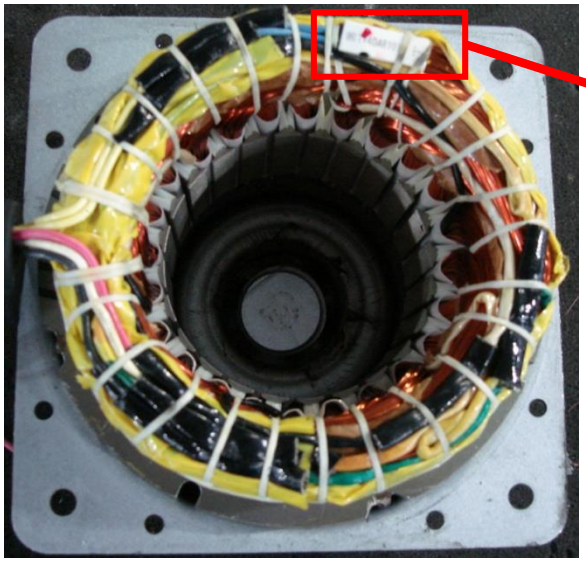
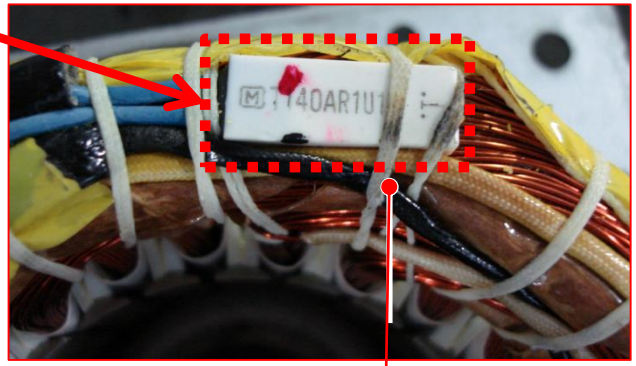
3. Additional features

■ safety and prevention (Blower Motor)





Sensor to detect overheat

◈ Blower Fan Motor of world class qualified in quality and performance

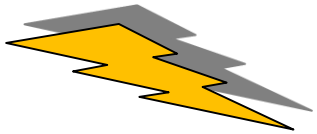
◈ protect motor by overheat detection sensor

◈ Blower Fan Motor with less defect ratio → increasing productivity by higher reliability

◈ operating at 140℃

4. Nitrogen generator (ESP series)

Possible to operate on either Reflow PC monitor or ESP Touch panel



Spec	Unit	
Input pressure	Mpa	0.65 (6.5kgf/㎠)
Output pressure	Mpa	0.4 (5kgf/㎠)
Output purity	ppm	200
Output diameter	Inch	16mm(16A)
Voltage	V	220V 60Hz
Operation temp	℃	5~35℃
Operation humidity	%	30~80%
Control power	V	DC24V
Noise	dB[A]	65
Option	-Cabinet Type -Monitoring (RS-485) -Flow Sensor output	

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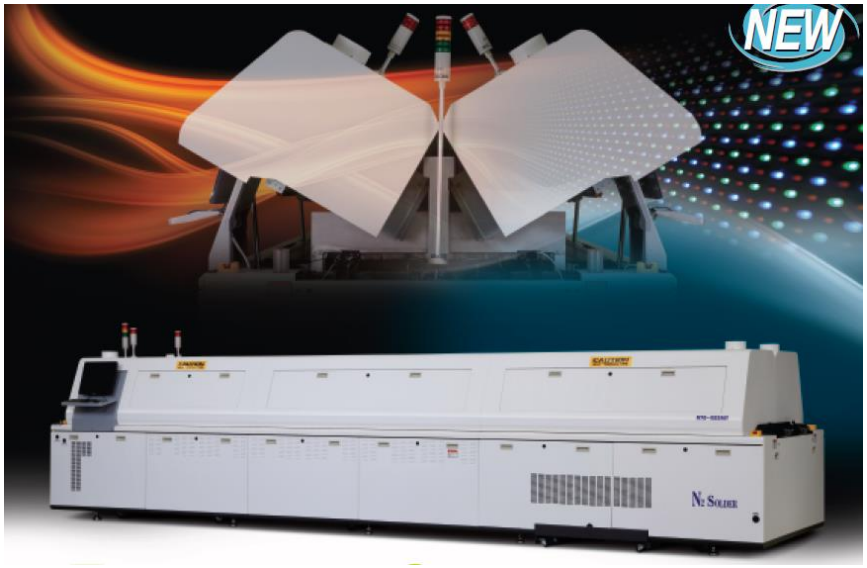

THANK YOU ☺