TRN II-E SERIES

New Generation of N2 Convection Reflow Oven

TRN II-E

SMART UPGRADE OF N2 REFLOW OVEN

Brilliant in every aspect

Equipped with innovative **Triple Flux Collection System**, **TRN II** is the most advanced convection reflow oven in the industry boosting outstanding solder quality whilst keeping the machine cleaner from flux residue and delivers the wider temperature divergence between zones by evenly distributing purified gas to every zones.

TRN II HIGHLIGHTS

Originative &
Best-in-industry
Triple Flux Collection System

Enhanced
Temperature Divergence
between zones

Minimal N2
Consumption

PSA interlocked Reflow MMI + N2 level precision Control

User-centered Intuitive, Smart Operation
powered by in-house developed S/W

Most Durable Ever!
World-class proven Electronic Components & Top-grade Stainless Steel

FMS
INNOVATION

Two-times Greater Flux Recovery Capacity

The cleanliness of Inside Reflow oven is one of the most crucial factor affecting the solder quality and productivity yield in the reflow process. The **Triple Flux Collection System** of TRN II Reflow collects and purifies the contaminated flux first in inlet area, again in peak zone and once again in cooling zone and keeps the machine clean and dry.

The originative **2-Way FMS** of TRN II distributes the purified N2 gas separately to cooling zones and heating zones after collecting and purifying contaminated flux from each zones, so that the temperature divergence between zones is maximized and eventually achieves the excellency in the solder quality.

Inside TRN II is made of a specially-treated stainless steel and a perforated stainless steel to prevent from adsorbing flux or to easily remove adsorbed flux simply by wiping with cloth. The **Flux Collection Level Sensor** of the FMS provides the exceptional convenience to the operators for cleaning alarm and significantly minimizes the maintenance time.

TRIPLE FLUX COLLECTION SYSTEM

2 Times Greater
Flux Collection Capacity

There are 3 stages of cleaning flux residue in TRN II.

Firstly, Flux residues in the inlet area are decomposed by the heater and exhausted outside the machine.

Secondly, FMS installed in the heating zones collects the flux residues and

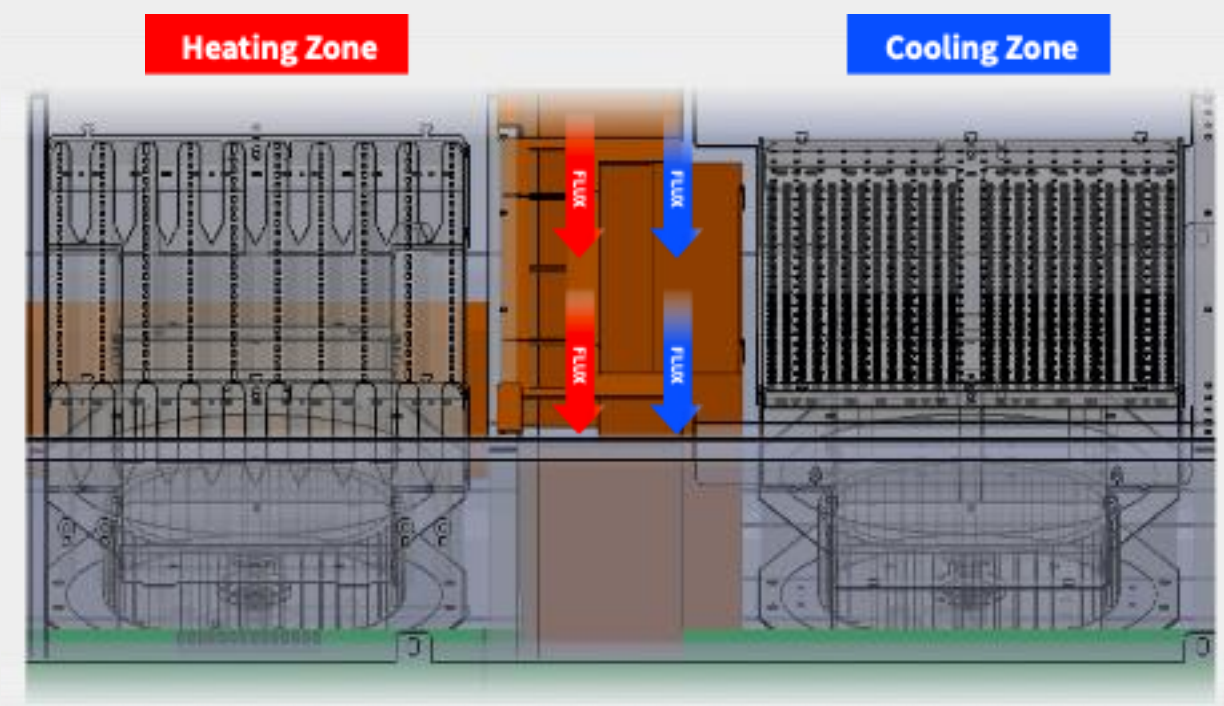
finally the flux residues in cooling zone area are removed by the additional FMS in cooling zone area.

* FMS in heating zone Optional

2-Way FMS

Cleaner than ever

TSM's originative 2-Way FMS brings the significant increase in flux collection capability by collecting flux and purifying N2 individually not only from cooling zones but also from heating zones and distributing the purified gas to originated zones. This feature enhances the temperature separation range by zones and delivers the optimum solder quality.

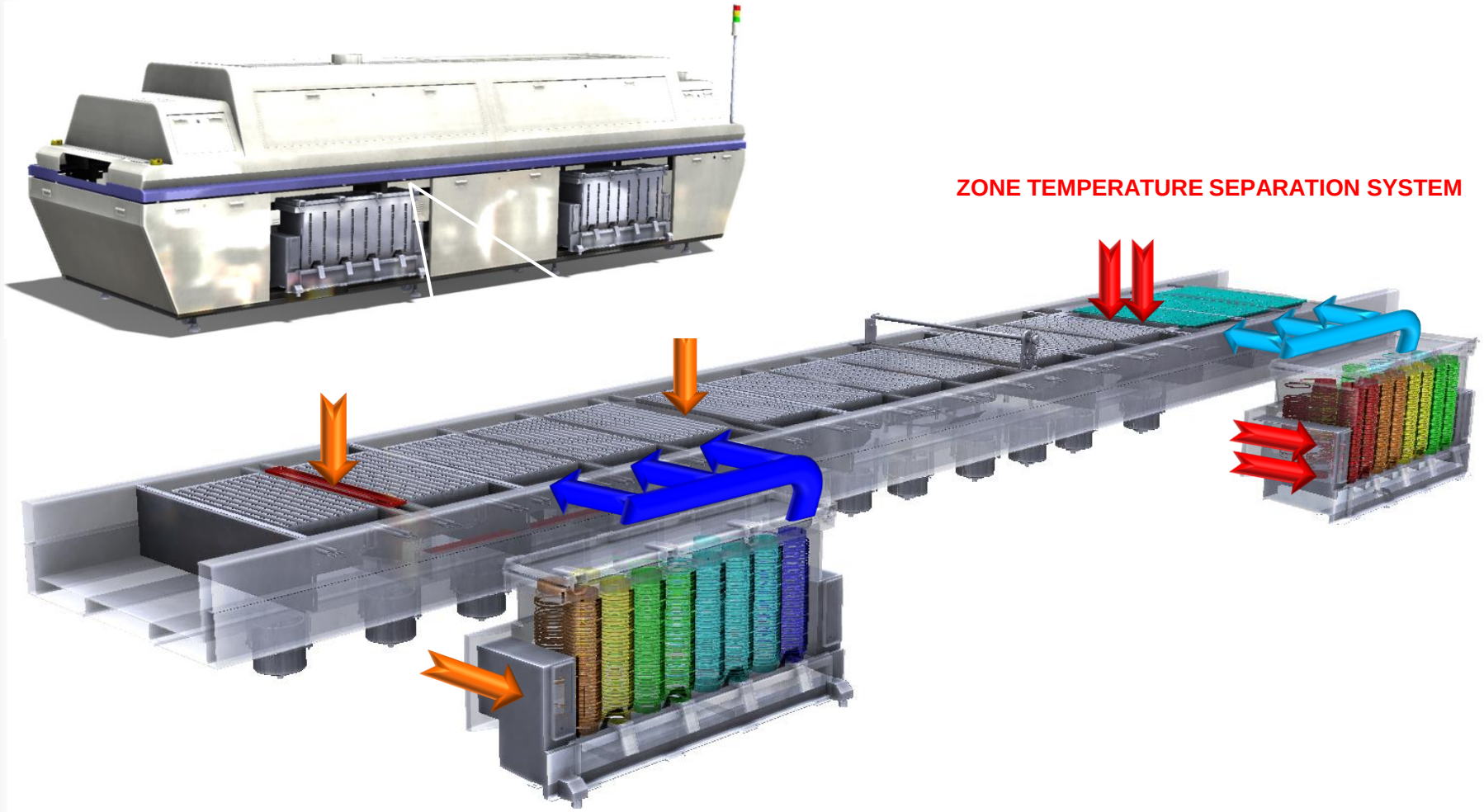


DUAL FMS

Zone Temperature Separation System

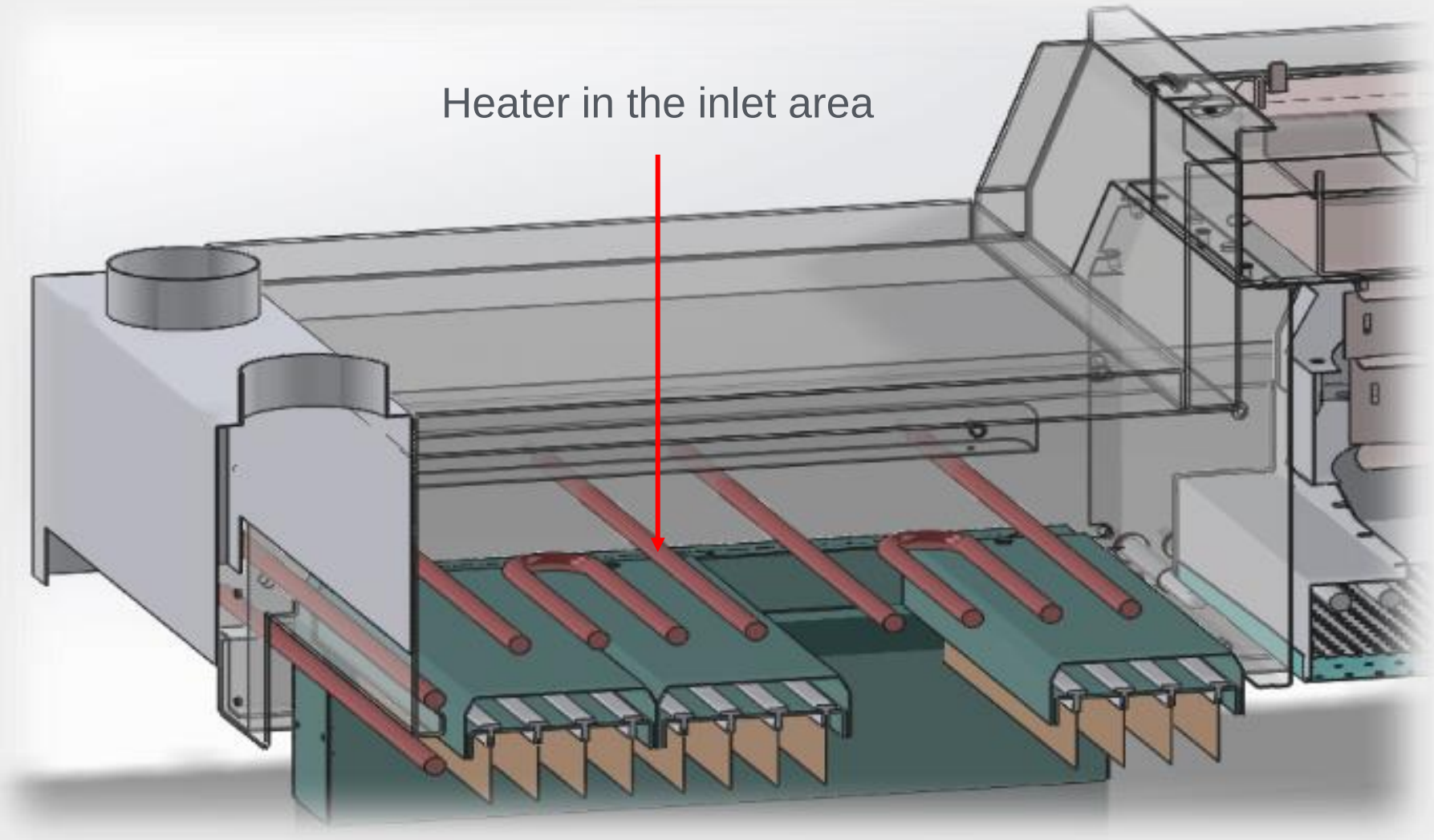
TRN II enables to efficiently control the individual temperature of each zone by directly injecting the purified N2 gas to its originated zones after flux filtration process, facilitating wide flexibility of temperature profiles.

* Dual FMS option



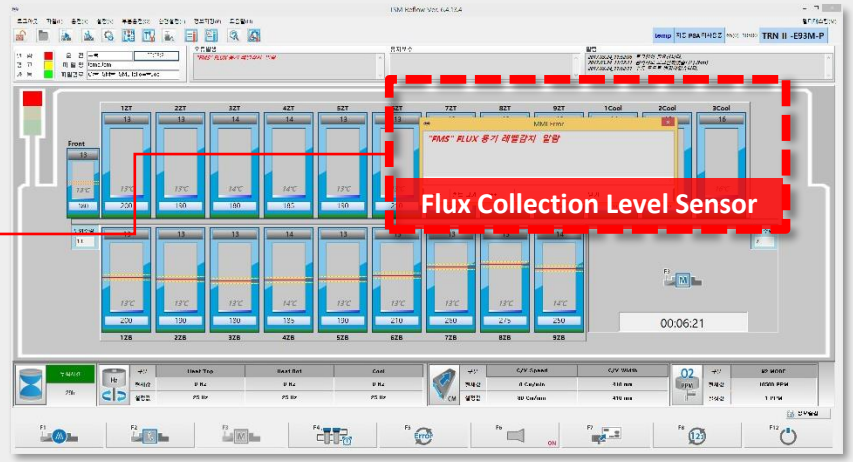
Inlet Flux Exhaust System

By installing the heater in the inlet area where the flux is most easily made, TRN II-E prevents flux accumulation and keeps the reflow oven clean from flux contamination.



Easy & Convenient Flux Management

TRN II smartly informs the cleaning time of FMS by sensing and alarming **Flux Collection Level sensor**. For ease of maintenance, FMS is easily detachable, made of one-touch sliding structure and extends the machine uptime from the loss of cleaning time.



One-Touch Sliding FMS Structure

Minimal N2 Consumption

PSA interlocked
&
Precision-control

SMART Energy Saving

Minimal N2, Maximum Energy Efficiency

TRN II Reflow oven creates the high purity Nitrogen atmosphere in very smart way, minimizing N2 consumption and maximizing energy efficiency and consequently **saves the cost of ownership**.

TSM is the only manufacturer in the world that designs and produces reflow ovens and N2 generators(PSA), both interacting each other. With **exceptional interlocking feature between the Reflow oven and the N2 generator**, N2 consumption is intelligently and automatically controlled and substantially reduced. TSM also developed the **world-first PSA-built-in Reflow oven(option)** providing the maximum space flexibility at the work place.

With combination of the triple enclosure structure for efficient closed-loop system preventing external air coming into the process zone, the electronic digital valve to precision-control N2 flow level, and Real-time PPM monitoring program, TRN II saves N2 consumption in smartest way and reduce the energy consumption extensively.

Precisional Control of N2 Atmosphere

Maximum Energy Saving from Minimum N2 Consumption

TRN II reflow allows the greater saving in N2 consumption from super-precision control of Air and N2 level and guarantees minimal energy consumption from the stable operation at low N2 pressure.

Specially designed **Triple Enclosure Curtain** at the inlet and outlet area to guarantee most efficient **full-closed loop system**

Super-precision automatic PPM & Air control by **PID and Electric valve**

Even and stable PPM level at whole zones from **N2 flow auto control system** and **Individual-zone Digital panel**

Perfect O2 Control of all zones

Precision-control of N2 Consumption and Optimal sealing

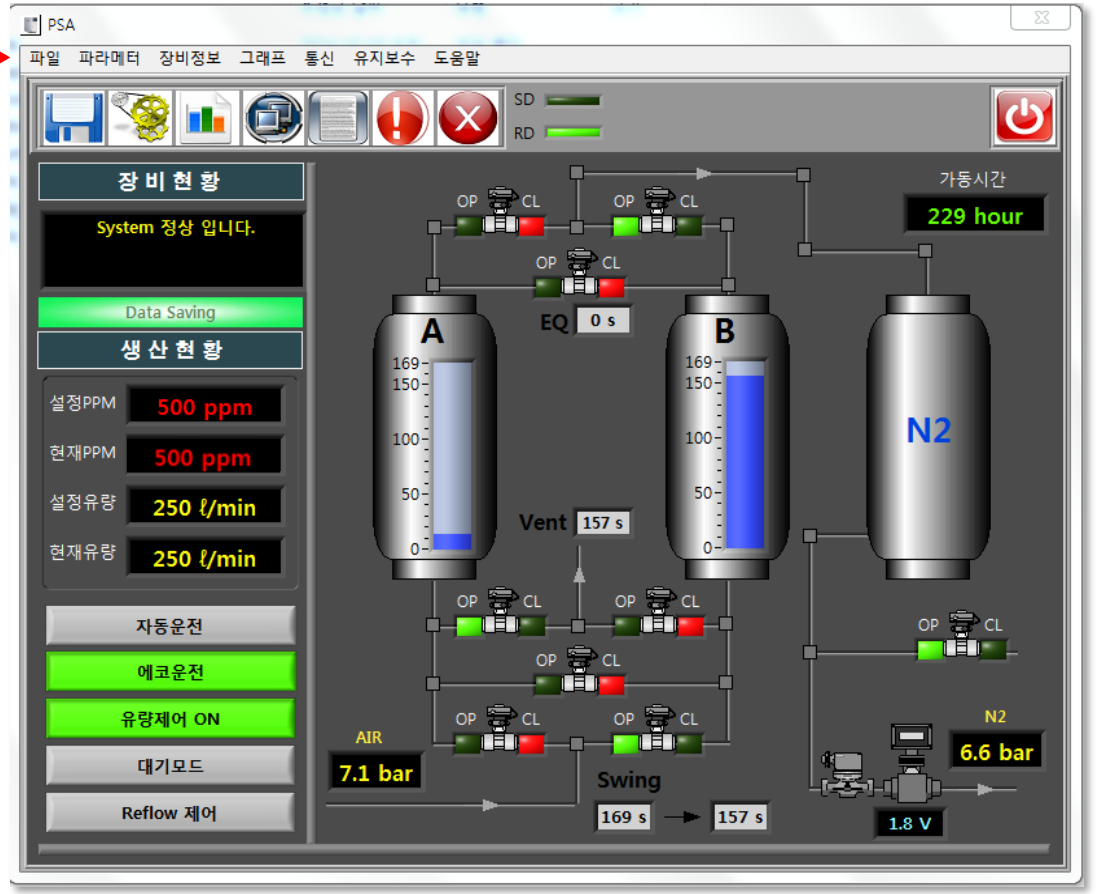
The precision-control of N2 consumption and the optimal sealing structure enable the stable O2 PPM supply for wholes zones and deliver the perfect N2 profile.

Industry's First
PSA-Interlocked
Reflow System

Inter-operational Energy Saving PSA System

With TSM's extensive capability to design and manufacture reflow oven and PSA together, Nitrogen consumption can be greatly reduced thru the interlocked control between both equipment.

* PSA Optional

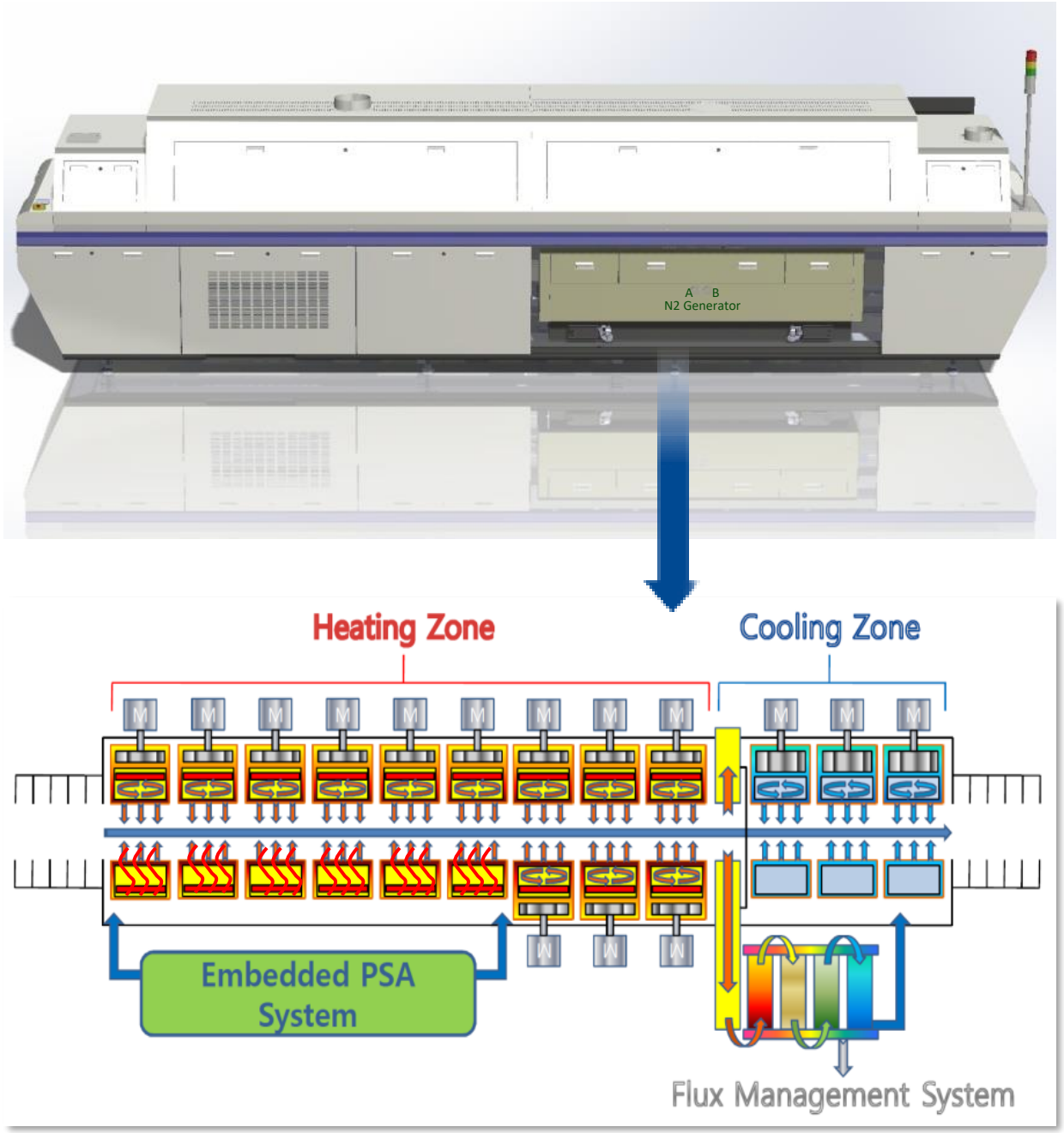


Industry’s First **Built-in PSA** ever

Built-in energy saving PSA

TSM’s ingenious PSA-built-in Reflow Oven equipped with the auto-control of N2 flow level delivers industry’s best work-space management and reduces electricity cost thru highly efficient energy management.

(Availability of the reflow oven with built-in PSA needs to be determined and evaluated by the local regulation of the customer’s country.)



S/W

MMI, monitoring, Remote Control

Intelligent & Intuitive

Inhouse-engineered Software Package

Easy to Operate & User Centered

TSM's intuitive MMI and monitoring software offers **clear visualization at a glance** for reflow process monitoring and user-centered easy operation. The prior alarm messages for crucial check-points for the stable operation and the machine maintenance minimize the machine downtime. Whole reflow processes are monitored and remotely-controlled intelligently not only from PC monitor but also from central server or even smartphone.

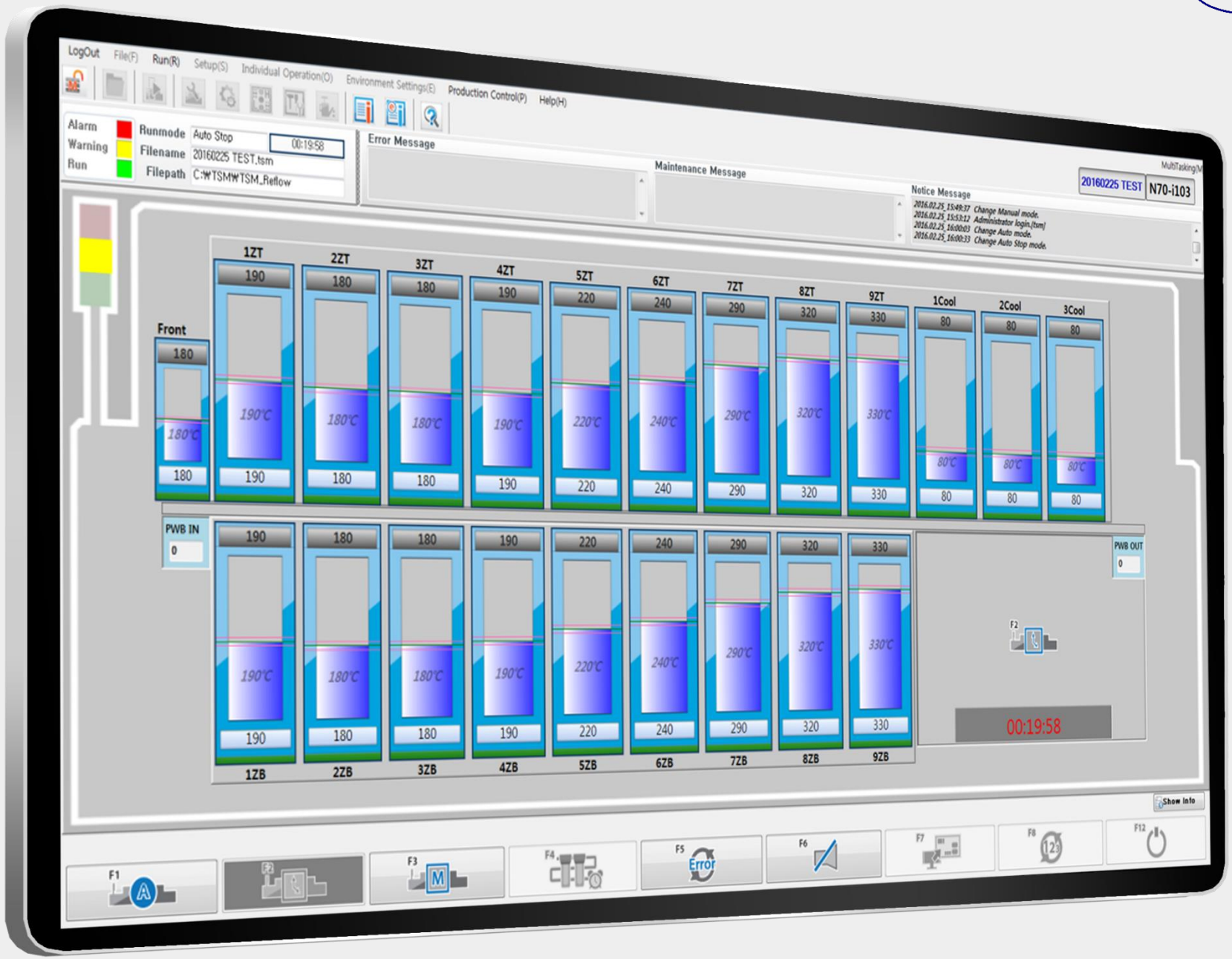
TSM software is designed and developed by inhouse S/W development division. TSM is able to deliver **the customized software solutions** for customer's Database and customers production system.

Intuitive MMI

Easy to Operate & User-Centered

Intuitive menu interface and infographic UX design enables Users to monitor the whole process of Reflow inside at a glance.

Alarm messages related to the machine maintenance can be pre-set up to 10 check-points and maximizes the longest stable production uptime.



Quality Management

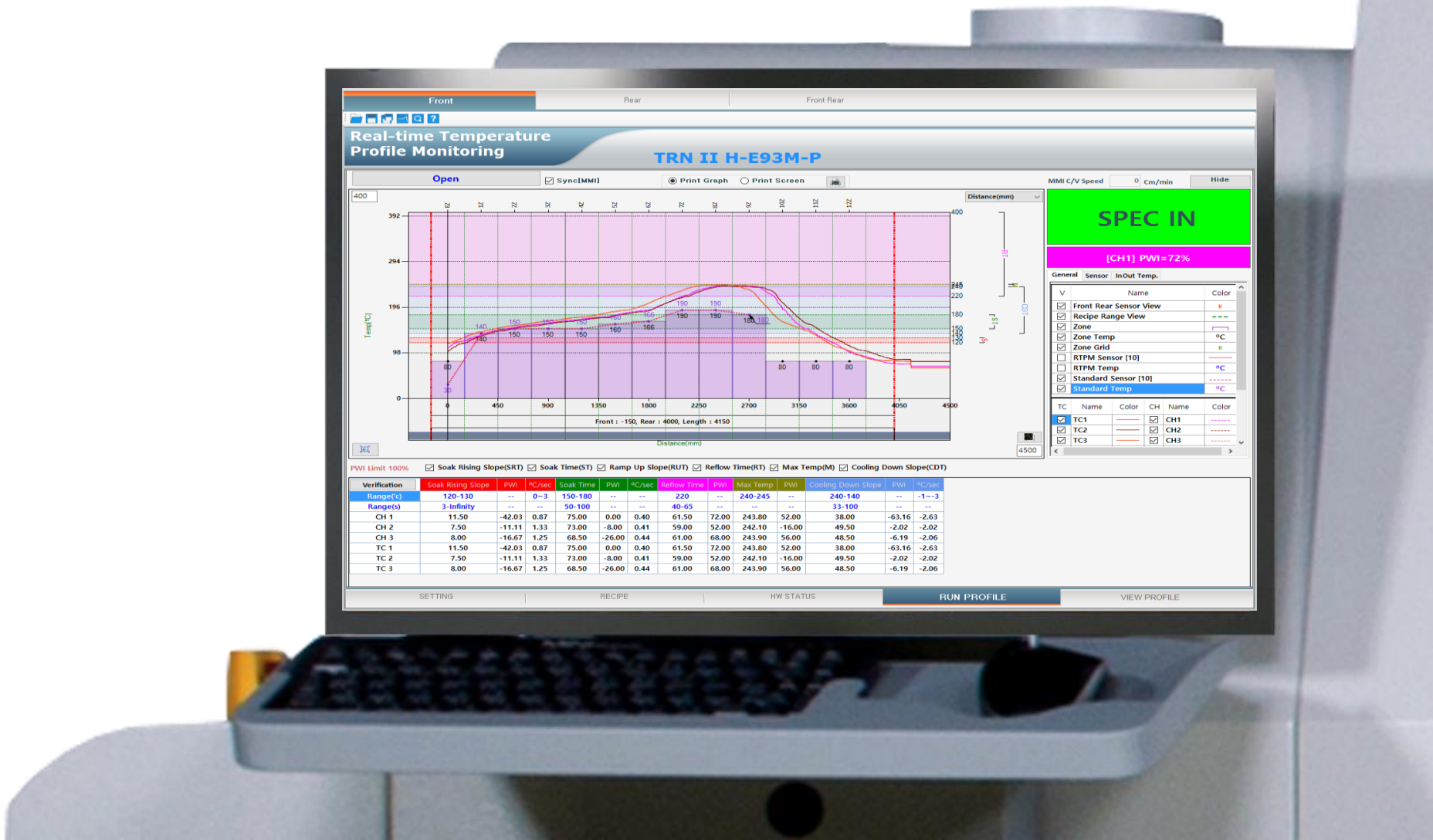
RTPM

Realtime Temperature Profile Monitoring System RTPM

RTPM provides the real-time temperature information of each zones on screen to ensure quality monitoring. RTPM also logs the temperature profile database of each production board model and enables excellent process traceability (with Barcode scanner Optional) of each board by recalling the temperature profile which has been recorded previously, minimizing machine down-time.

OPTION

Basic Sensor Type, Wired Sensor Type



Quality Management

RPPM

Realtime O2 PPM Profile
Monitoring System

RPPM provides the real-time O2 PPM information of each zone during the reflow process and records the profile data for traceability. When the board model needs to be changed, RPPM minimizes the machine downtime for the new O2 profiling process and provides the exceptional production management by a board and by time.

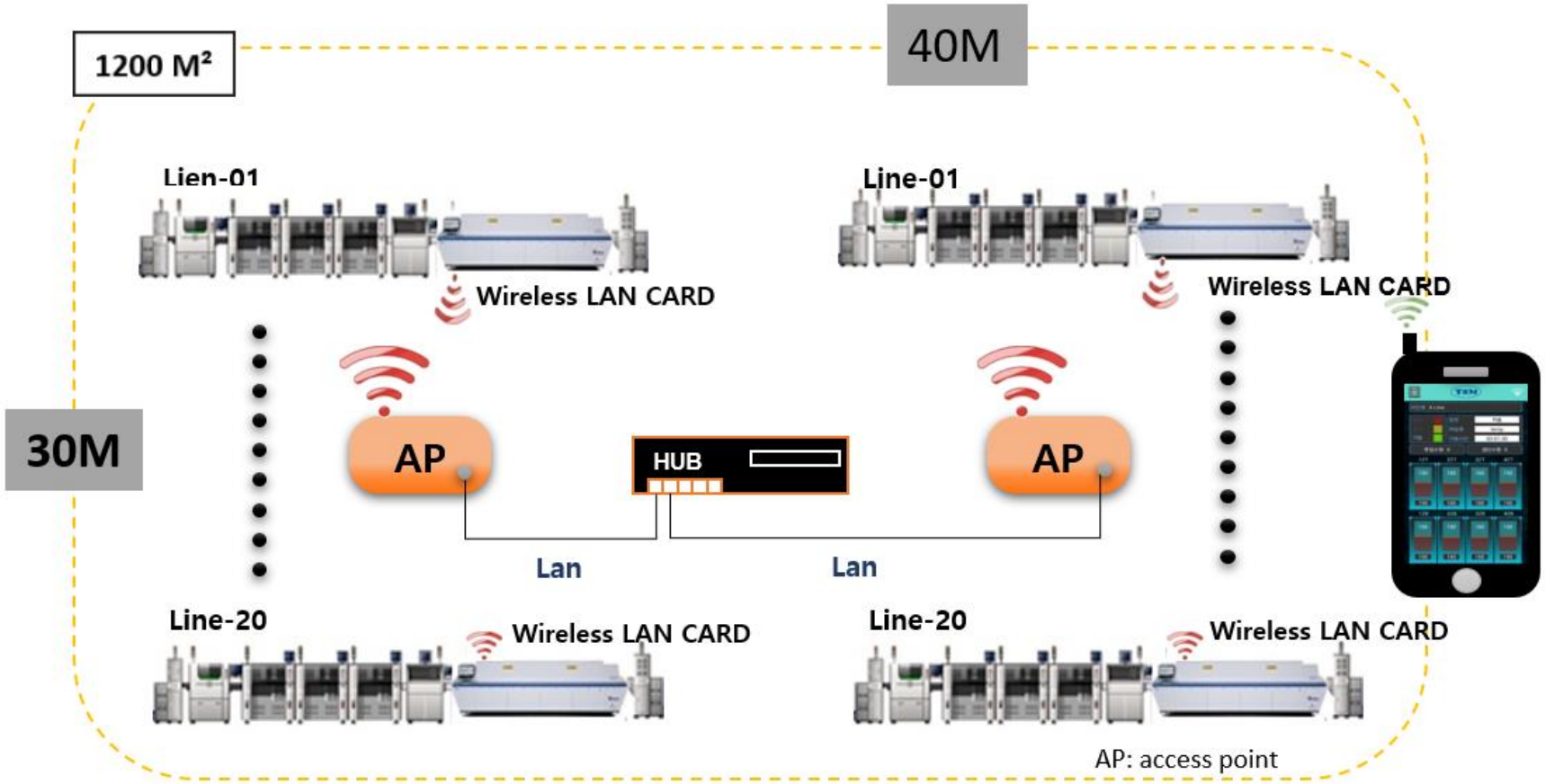
OPTION

REMOTE CONTROL SYSTEM

SMART MONITOR & CONTROL SYSTEM

Users can monitor the reflow process, operating mode and alarming status from the smart phone or the central server. From the central server, users can not only monitor the reflow process but also remote-control the change of the production model, the mode change for auto or manual and the machine stop which eventually realizes unmanned production line.

OPTION



Durable & Dependable

Most Durable Ever Built

Class-different **Durability**

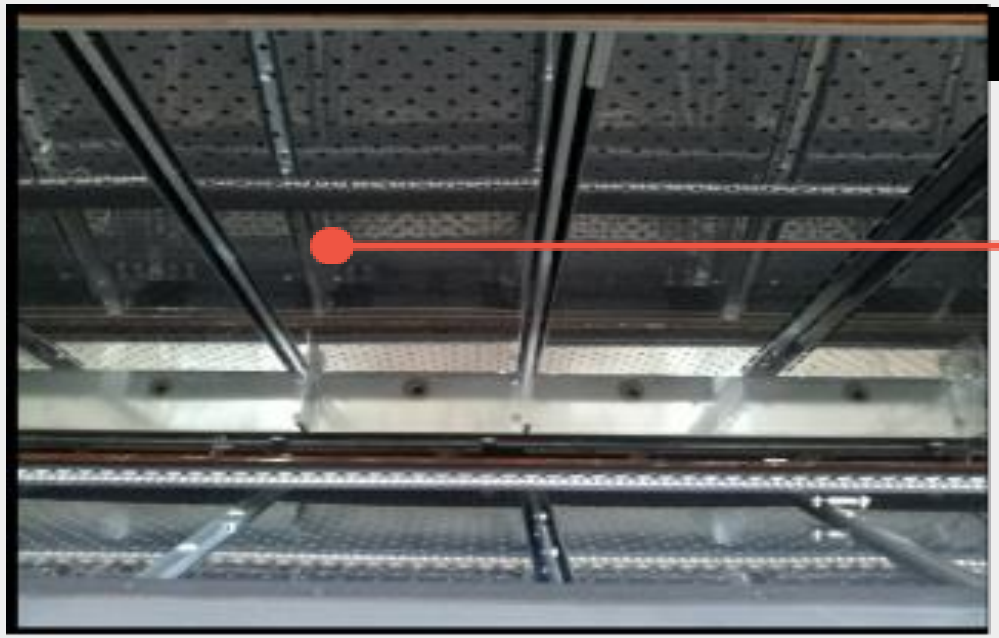
TSM Reflow ovens are most dependable and reliable. TSM use only world-best proven core components for the control unit. TSM's reflows are designed and structured in specially-developed material to prevent thermal deform, guaranteeing industry's best durability and reliability.

TSM's innovative conveyor system ensures the optimum grip & fail-free transport of PCB from bent, fall and jammed issues.

Most Durable

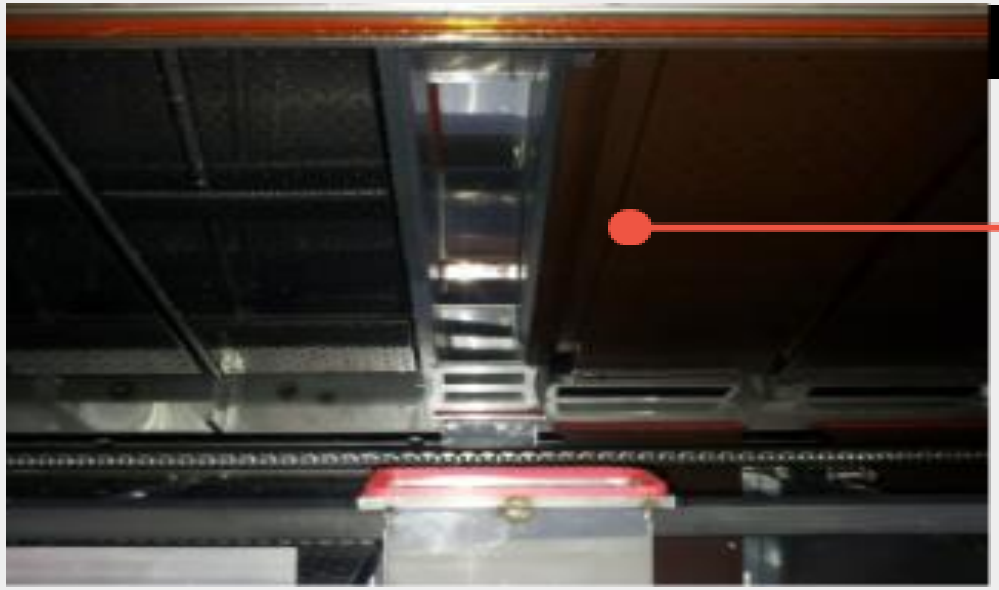
Specially-treated Teflon Coated Perforated Metal Plate

Inside oven is made of Teflon-coated perforated Stainless steel to prevent metal rust and undesirable adsorption of contaminated flux residue onto the perforated metal plate.



Inside oven

Anti-Corrosion SUS perforated Stainless Steel



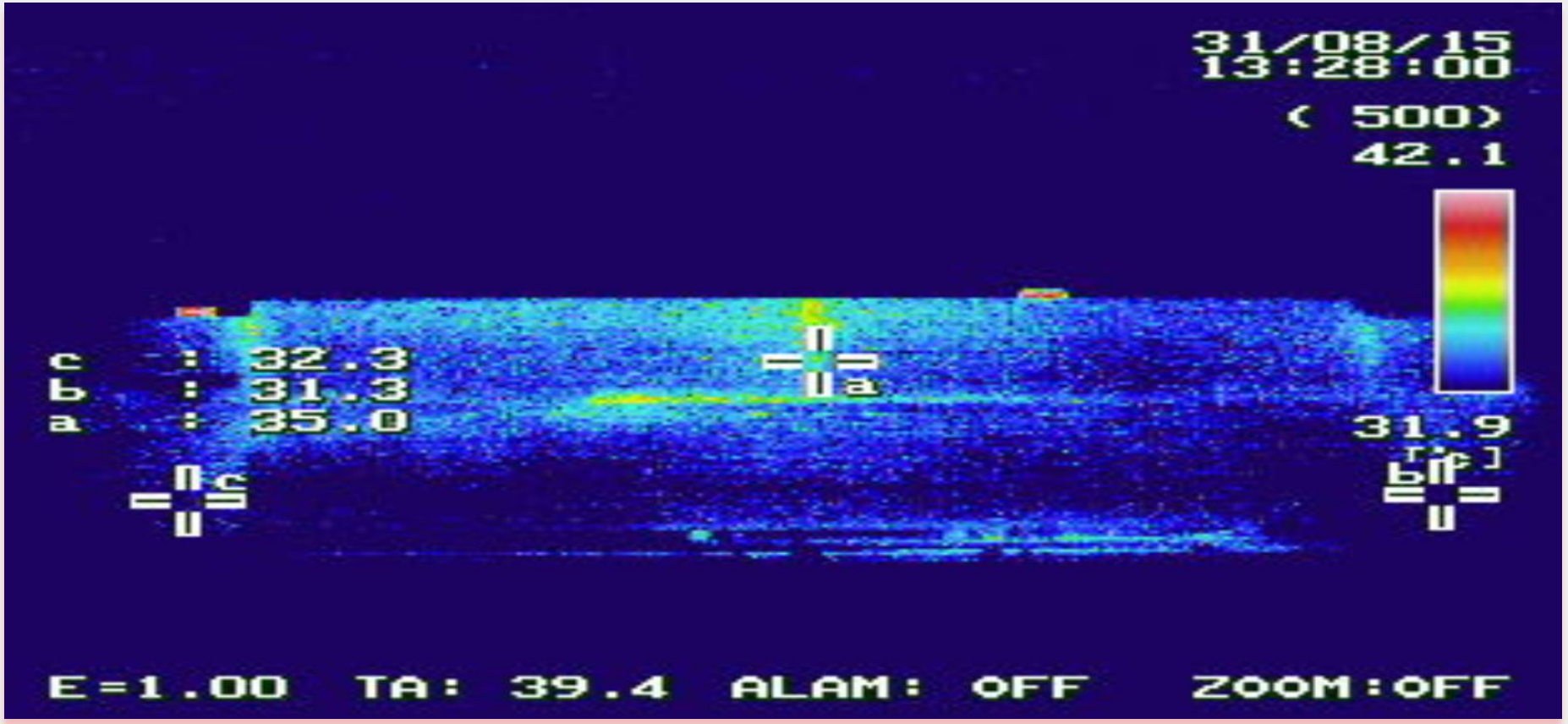
Cooling zone

Teflon Coated

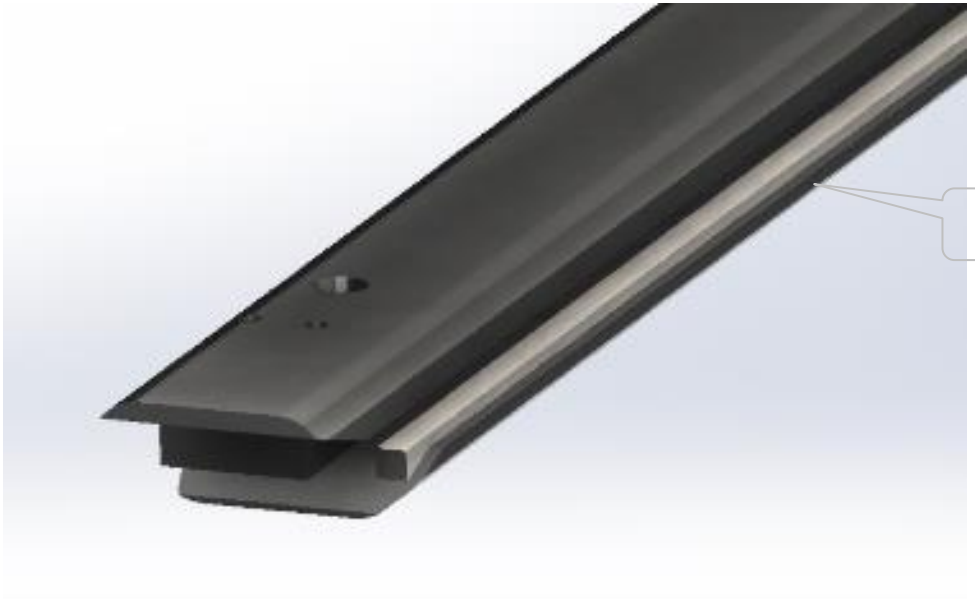
Most
Durable

Upper Cover Insulation

Innovative insulation structure of TRN II reflow enables to control the temperature of the top cover below 35℃. By keeping the heat emission to outside machine minimal, this feature can contribute to the improvement on working environment especially in tropical countries like Vietnam and India, as well as the saving for cooling cost.

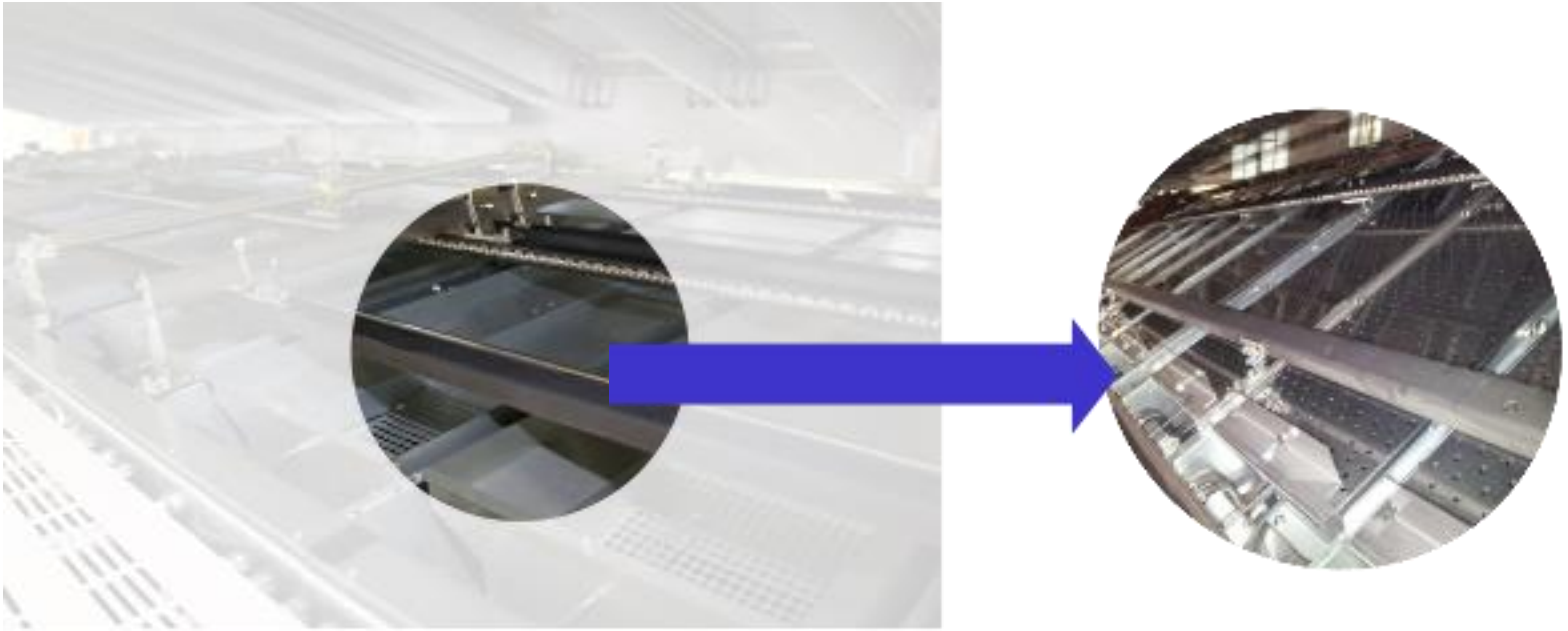


Most Durable



Enhanced Rail Durability

The specially-treated SUS Support Bar is additionally built-on to prevent the friction and the wear between rails and conveyor chains, which prevents unwanted PCB drop from the conveyor by reducing the sagging of conveyor chains.



Minimal ΔT Inside Open Temperature

Specially heat-treated compact-sized rails minimizes ΔT within a zone and significantly lower the rail deformation from long-time heating.

Most Dependable

High Performance Control Unit

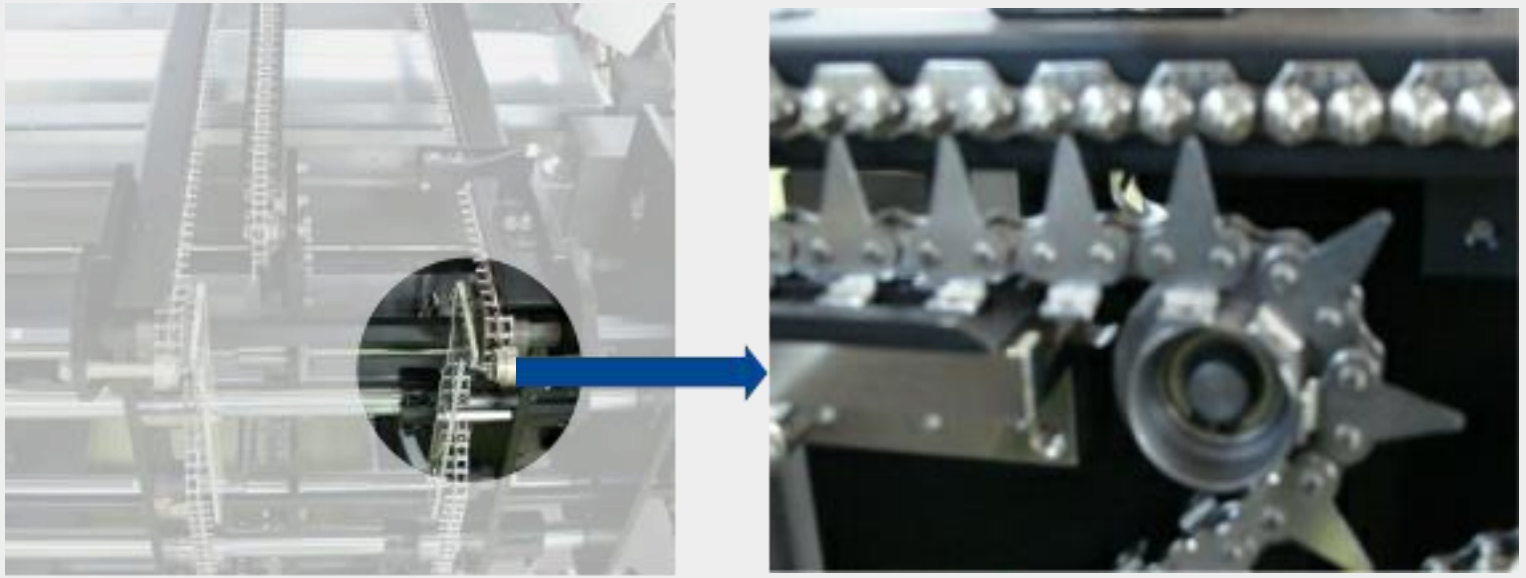
TRN II Reflow is highly reliable, highly stable and highly competent. Control Unit and core components are built-up by only world-best proven components and its modular structure allows the minimum downtime by easily replacing faulty parts.

CONTROLLER
Auto Tuning,
Time Proportional PID Control
Individual Monitoring by S/W

OMRON PLC
Proven renowned Quality

FUJI INVERTER
Fan speed control in Heating zone and Cooling zone
Preventing fine pitch ICs blown by fan
Blow motor RPM control by PC MMI program

Most Dependable



Thermal Deformation-free Chain

The chain is made of top-grade specially alloyed metal to prevent the thermal deformation, ensuring the safe board transfer without sagging or drop.

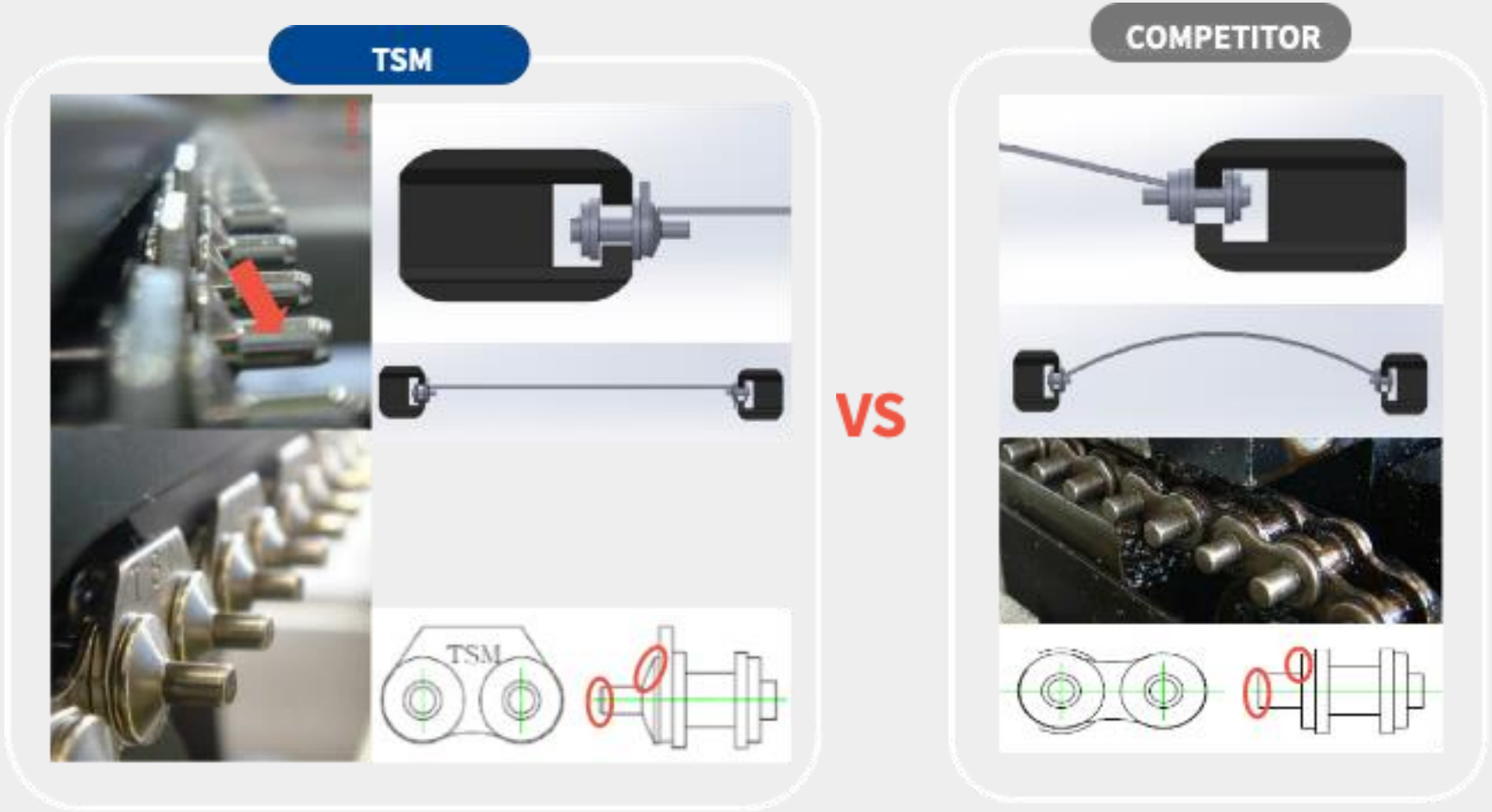
Conveyor Chain Lubricator Level Sensor System

The Conveyor chain oil level system monitors the lubricator level and sends the alarm message when the level go down below preset level, ensuring the lifespan of conveyor chains.

Most Dependable

Board Jam Prevention Chain Structure

Board Jam with Chain issues are remarkably reduced by introducing tilting angle between chain and pin. The self-alignment feature enhances the production yield.



Thank you !