

Company Profile

**TOTAL EQUIPMENT SOLUTIONS FOR SEMICONDUCTOR
& SOLAR CELL FURNACE !**

For inquiries in North America,
please contact SemiStar at
sales@semistarcop.com for
more information.



P&TECH Quality is our business~

P&TECH

Company Introduction

MOTTO : FAITHFUL TO BEGINNING MIND
(People & Technology)

1. Introduction

CEO

Park Jong Sin

Establishment

June-20-2002

Address

Korea : 782, Musimdong-ro, Cheongwon-gu, Cheongju-city, Korea
China : Changzhou TS-TECH / Biz office : Shanghai

Business item

PV Cell/Semicon Equipment Manufacturing

Employee

35

Customer

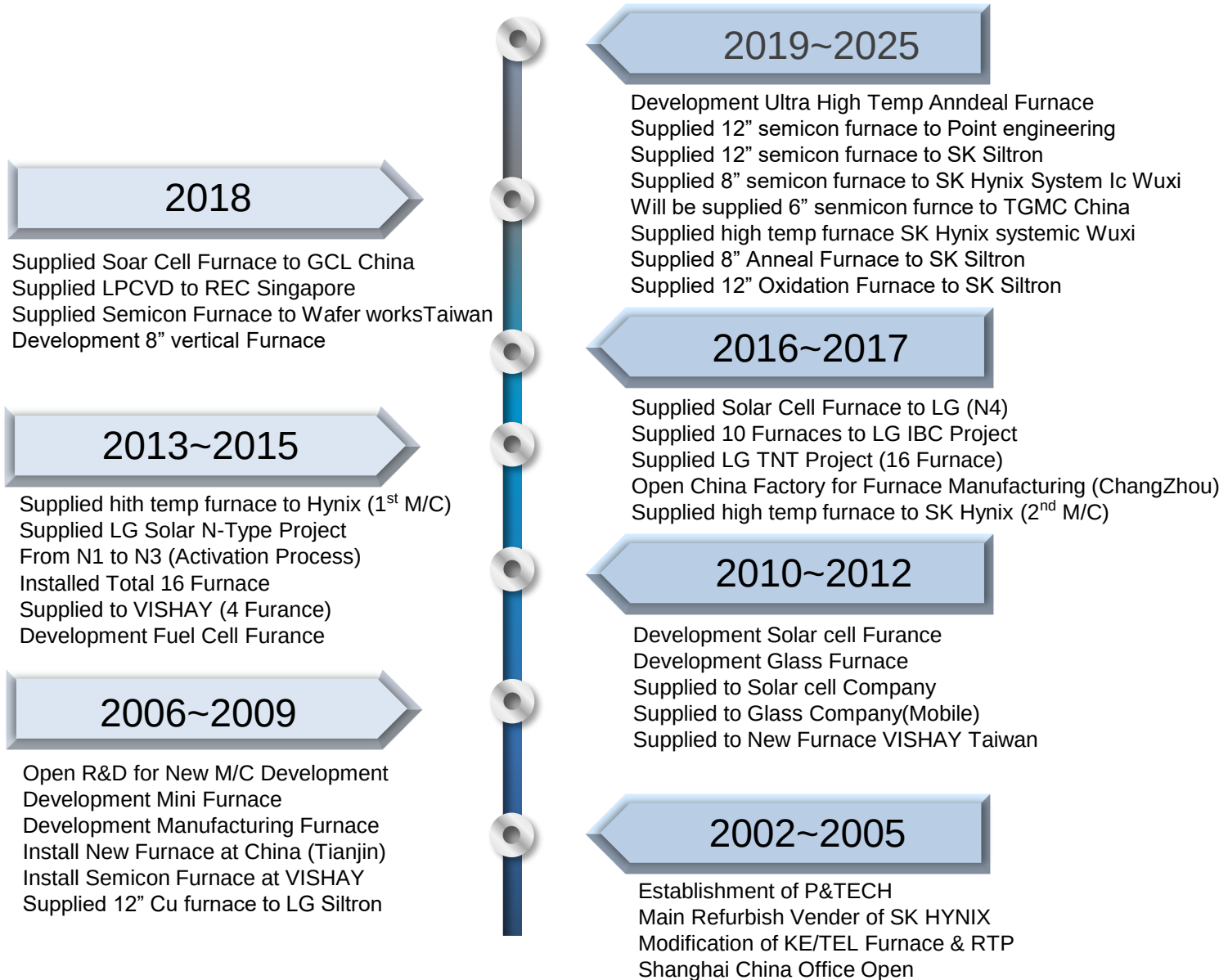
LONGI Solar, SILAN, SK Hynix, LG, Samsung, HHGRACE, REC Solar, Vishay, Waferworks, SK Siltron

2. Main Production Item

- Solar [Control oxide, LP-POCL3 Diffusion, LP-CVD POLY & D-POLY , PE-CVD, Activation]
- Semiconductor [Oxidation, Poly , Nitride , LTO, Drive in , Sintering]
- Automation [PV cell & Battery line]
- Glass [Ion chemical glass strengthening furnace]
- Pump cap Assembly Machine
- Fuel cell / Graphene CVD Furnace
- Part's [Heater , Spike and profile T/C]

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Company Introduction



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Company Introduction

For Worldwide Customer Service, P&TECH have Overseas Branch Office

Headquarters



- Location : **Korea P&TECH** (Cheongju)
- Manufacturing Equipment(semi/solar/etc)
- R&D FAB Development
- S/W & Mechanical Design
- OEM Furnace Refurbish

China Manufacturing



- Location : **China, TS-TECH** (Changzhou)
- Equipment Manufacturing
- **Heater Manufacturing**
- T/C Manufacturing
- On-Site Service Team

China Sales Office

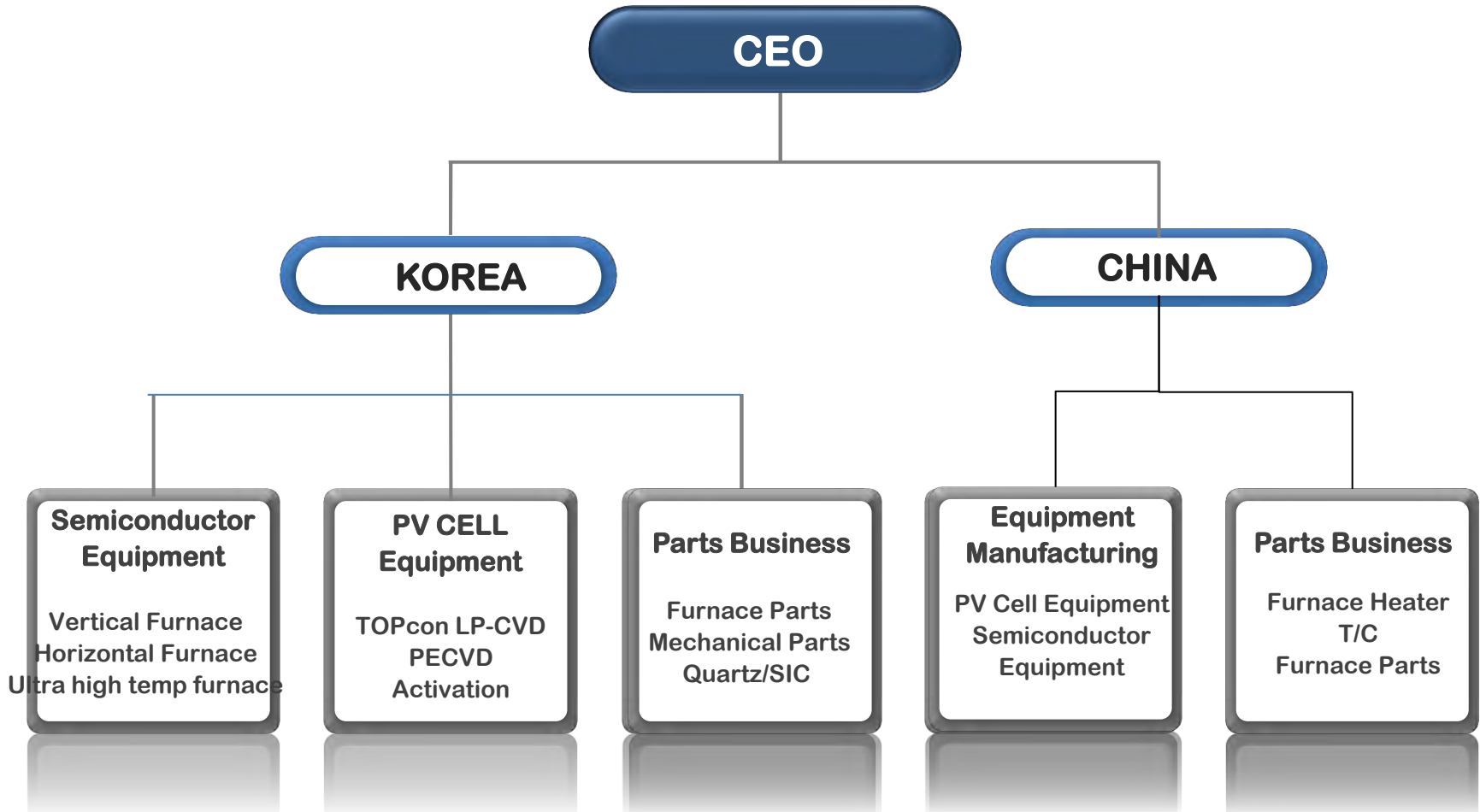


- Location : **China, 韓晶電子** (Shanghai)
- China Sales Team

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1. Company Introduction

Organization Chart

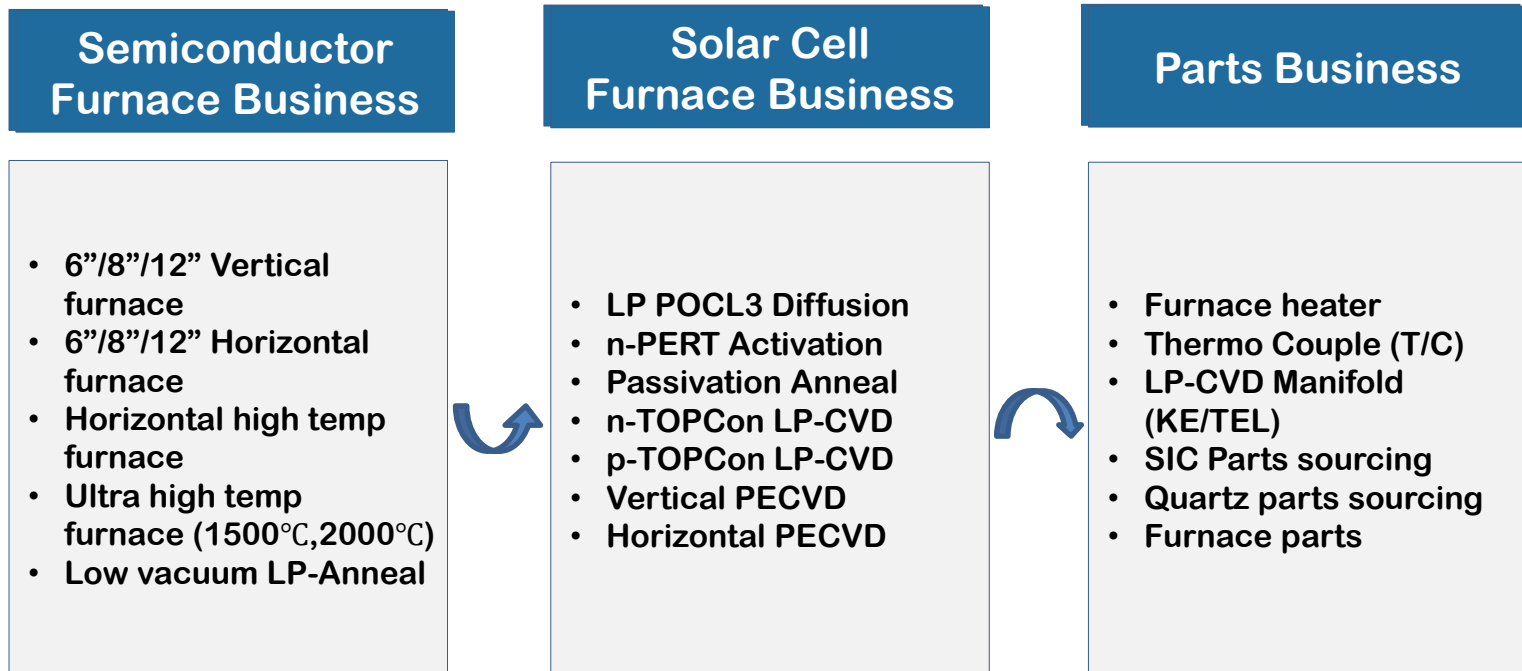


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2. Production Items

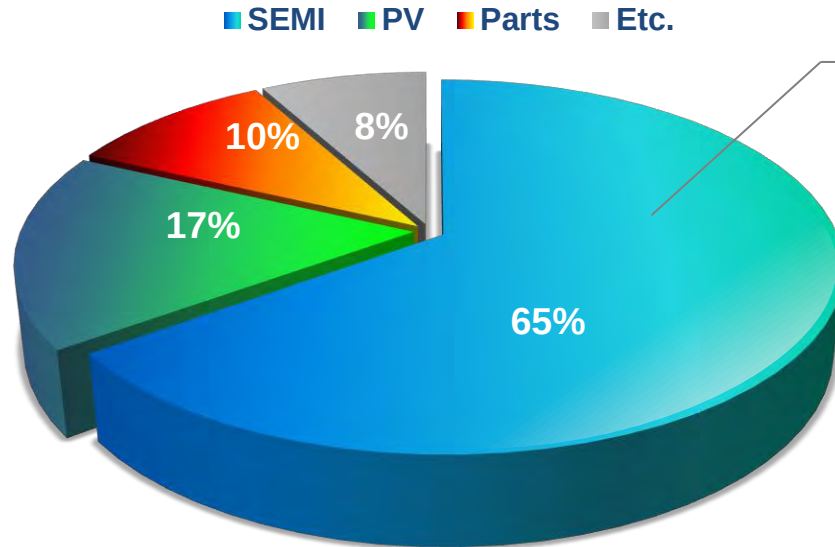
Professional Company For Furnace Manufacturing!

Since our establishment, we have made every effort to develop furnace equipment.



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3. Sales Portion & Main Customer



• Semiconductor Furnace

P&TECH has been manufacturing only thermal equipment since its establishment.

P&TECH has further developed 6"/8"/12" semiconductor furnace based on equipment manufacturing technology.

P&TECH has been striving to become a leader in the Manufacture of vertical furnace equipment.

Main Customer for Semiconductor Furnace



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4. Semiconductor Furnace Business

Professional Company For Semiconductor Furnace Manufacturing!

Since our establishment, we have made every effort to develop furnace equipment.

Vertical Furnace

- 6" Vertical Furnace
- 8" Vertical Furnace
- 12" Vertical Furnace



Horizontal Furnace

- 4"/6"/8"/12" Horizontal furnace
- High temp furnace (1300°C)
- Wafer manufacturing QC/R&D Furnace



Horizontal LP-Anneal

- Low vacuum LP-Anneal
- N2 / H2 Anneal



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4. Semiconductor Furnace Business

6 inch Vertical Furnace



No.	Item		Spec
1	General Spec	Wafer Size	150mm
2		Production Wafer	150
3		Process Application	PYRO, LP-CVD, ANNEAL
4		System Dimension	
5		Wafer Loading	Full Automation
6		Wafer Mapping Sensor	Installed
7		Heater Control Zone	5 Zone
8		Temp Flat Zone	860mm
9		Main Control	PLC + PC control
10		Boat Rotation	Installed
11		MES, FDC Control	Yes
12	Hardware Performance	Temp accuracy	Set/Actual : $\leq 0.5^{\circ}\text{C}$
		Gas flow control	Set/Actual : $\leq 1.0\%$
		Wafer breakage	0.01%
		Safety	Safety interlock, Mapping Sensor, leak detector
11	Process Performance	Particle	< 20ea (0.16um)
		Thickness Uniformity	Oxidation : $\leq \pm 1.0\%$ LP-CVD : $\leq \pm 2.0\%$
12	Customer	TGMC, STM	

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4. Semiconductor Furnace Business

8 inch Vertical Furnace



No.	Item	Spec
1	General Spec	Wafer Size
2		200mm
3		Production Wafer
4		150
5		Process Application
6		PYRO, LP-CVD, ANNEAL
7		System Dimension
8		Wafer Loading
9		Full Automation
10		Wafer Mapping Sensor
11		Installed
12	Hardware Performance	Heater Control Zone
13		5 Zone
14		Temp Flat Zone
15		860mm
16	Process Performance	Main Control
17		PLC + PC control
18	Process Performance	Boat Rotation
19		Installed
20	Process Performance	MES, FDC Control
21		Yes
22	Hardware Performance	Temp accuracy
23		Set/Actual : $\leq 0.5^{\circ}\text{C}$
24		Gas flow control
25		Set/Actual : $\leq 1.0\%$
26	Hardware Performance	Wafer breakage
27		0.01%
28	Hardware Performance	Safety
29		Safety interlock, Mapping Sensor, leak detector
30	Process Performance	Particle
31		< 20ea (0.16um)
32	Process Performance	Thickness Uniformity
33		Oxidation : $\leq \pm 1.0\%$ LP-CVD : $\leq \pm 2.0\%$
34	Customer	SK HYNIX SYS IC, NNFC, SK SILTRON

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4. Semiconductor Furnace Business

12 inch Vertical Furnace



No.	Item		Spec
1	General Spec	Wafer Size	300mm
2		Production Wafer	50~150
3		Process Application	PYRO, LP-CVD, ANNEAL
4		System Dimension	
5		Wafer Loading	Full Automation
7		Heater Control Zone	5 Zone
9		Main Control	PLC + PC control
10		Temp Control	PID Control
11		MES, FDC Control	Yes
12	Hardware Performance	Temp accuracy	Set/Actual : $\leq 0.5^{\circ}\text{C}$
		Gas flow control	Set/Actual : $\leq 1.0\%$
		Wafer breakage	0.01%
		Safety	Safety interlock, Mapping Sensor, leak detector
11	Process Performance	Particle	< 20ea (0.16um)
		Thickness Uniformity	Oxidation : $\leq \pm 2.0\%$ LP-CVD : $\leq \pm 3.0\%$
12	Customer	SK SILTRON	

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4. Semiconductor Furnace Business

8 inch Vertical Furnace
(wafer company)



No.	Item		Spec
1	General Spec	Wafer Size	200mm
2		Production Wafer	100 (Dual Boat)
3		Process Application	N2 Anneal
4		System Dimension	
5		Wafer Loading	Full Automation
6		Wafer Mapping Sensor	Installed
7		Heater Control Zone	5 Zone
8		Temp Flat Zone	860mm
9		Main Control	PLC + PC control
10		Wafer robot type	Vacuum chuck (5)
11		MES, FDC Control	Yes
12	Hardware Performance	Temp accuracy	Set/Actual : $\leq 0.5^{\circ}\text{C}$
		Gas flow control	Set/Actual : $\leq 1.0\%$
		Wafer breakage	0.01%
		Safety	Safety interlock, Mapping Sensor, leak detector
11	Process Performance	Particle	< 20ea (0.16um)
		Throughput	200매/시간
12	Main Customer		SK Siltron

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4. Semiconductor Furnace Business

Horizontal Furnace



Items			Specification
1	Wafer	Wafer Size	4",6",8",12"
2	System Type	Type	R&D Mini type / Production type
3	CAPA	Wafer Loading Qty	50~300pcs (Customer Order made)
4	Wafer Loading	Boat loading	Cantilever / Soft Landing
		Automatic	Wafer loading & boat loading (Customer option)
		Boat loading speed	50mm ~ 1500mm/min
		Paddle	Mini : Ceramic, Production : SiC
		Paddle moving	AC/DC Motor, LM/Ball Screw
5	Heater	Flat Zone Length	300mm ~ 1500mm
		Temp Control Zone	3 Zone ~ 5 zone
		Temp Accuracy	$\pm 0.5^{\circ}\text{C}$
		Temp Control	PID control
6	Process kit	Process Tube	Quartz, SiC
		Boat	Quartz, SiC
		T/C (Thermocouple)	R-Type, B-Type (high temp)
7	S/W & Controller	Main Controller	MITSUBISHI PLC
		Control Monitor	15" Touch monitor
		Temp Controller	YOKOGAWA Temp Controller
		Host Control	MES (M/C $\leftrightarrow$ Host P/C)
8	Customer	VISHAY, WAFERWORKS, SK SILTRON, SILAN AMPHENOL SENSING, KEC, AUK, SEGETRONIX, TGMC	

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4. Semiconductor Furnace Business

High Temp Horizontal Furnace

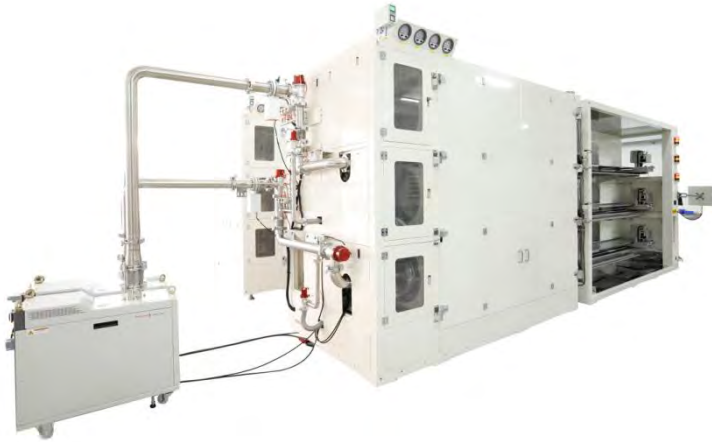


Items			Specification
1	Wafer	Wafer Size	200mm
2	System Type	Type	Horizontal Furnace
3	CAPA	Wafer Loading Qty	150pcs
4	Wafer Loading	Boat loading	Cantilever
		Wafer & Boat loading	Full Automation
		Boat loading speed	50mm ~ 1500mm/min
		Paddle	SIC Paddle
		Paddle moving	AC Motor, LM/Ball Screw
5	Heater	Flat Zone Length	1100mm
		Temp Control Zone	5 zone
		Temp Accuracy	$\pm 0.5^{\circ}\text{C}$
		Max Temp	1300°C
6	Process kit	Process Tube	SIC Tube
		Boat	SiC Boat (6.35mm pitch)
		T/C (Thermocouple)	B-Type
7	S/W & Controller	Main Controller	mitsubishi PLC
		Temp Controller	YOKOGAWA UT55A
8	Customer	SK Hynix System IC	

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4. Semiconductor Furnace Business

Horizontal LP-Anneal



Items			Specification
1	Wafer	Wafer Size	200mm
2	System Type	Type	Horizontal Furnace
3	CAPA	Wafer Loading Qty	150pcs ~300mm
4	Wafer Loading	Boat loading	Soft Landing
		Wafer Loading	Manual Type
		Boat loading speed	50mm ~ 1500mm/min
		Paddle	SIC Paddle
		Paddle moving	AC Motor, LM/Ball Screw
5	Heater	Heater Type	RC Heater
		Temp Range	100~500°C
6	Vacuum	Ultimate Pressure	5E-7 Torr
		Vacuum Pump	Turbo pump + Dry pump
7	S/W & Controller	Main Controller	MITSUBISHI PLC
		Temp Controller	YOKOGAWA UT55A
8	Customer	SILAN, LION, SAMSUNG, NNFC	

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4. Semiconductor Furnace Business

Mini Furnace



Customer Order Made Furnace

Items			Specification
1	Wafer	Wafer Size	4", 6", 8", 12"
2	System Type	Type	Horizontal / Vertical
3	CAPA	Wafer Loading Qty	10 ~ 50 wafers/tube
4	Wafer Loading	Boat loading	Vertical type : Boat elevator Horizontal type : Cantilever
		Wafer Loading	Manual Type
		Boat loading speed	50mm ~ 1500mm/min
		Paddle moving	AC Motor, LM/Ball Screw
5	Heater	Temp Range	100~1200℃
6	Process Application	AP Furnace	Oxidation, Anneal, Drive-In
		LP Furnace	Nitride, POLY/D-POLY, TEOS, HTO, LTO
7	S/W & Controller	Main Controller	MITSUBISHI PLC
		Temp Controller	YOKOGAWA UT55A
8	Customer	R&D, University LAB etc..	

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5. SiC Semiconductor Equipment Business

•Ultra High Temperature Oxidation Furnace

This is a high-temperature oxidation furnace that is essential in the power semiconductor devices. 6-inch furnace is provided as standard, and it can be modified to 8-inch in the future. It allows for rapid temperature ramp-up and stable temperature control.



Main Specification

- Model : PF-UHTO61
- Wafer size : 6inch (up to 8inch)
- Wafer loading capacity : 50~80
- Heater material : Super Kanthal
- Tube & boat material : SiC

Hardware Specification

- Maximum temperature : 1600°C
- Process temperature range : 800 ~ 1500°C
- Temperature ramp-up rate : 30°C/min
- Wafer loading : Full automation
- Process gas : N₂, O₂, L-O₂, DCE

System Performances

- Temperature flatzone : > 350mm
- Temperature stability : < ±1.0°C
- Gas flow accuracy : < ±1.0%
- Oxidation thickness uniformity : < ±2.0%

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5. SiC Semiconductor Equipment Business

•Ultra High Temperature Anneal Furnace

This is a high-temperature annealing furnace that is essential in the power semiconductor devices. 6-inch furnace is provided as standard, and it can be modified to 8-inch in the future. It allows for rapid temperature up-to 2200°C and stable temperature *control*.



Main Specification

- Model : PF-UHTA61
- Wafer size : 6inch (up to 8inch)
- Wafer loading capacity : 50~80
- Heater material : Metal Tungsten
- Tube & boat material : Graphite
- Heater chamber structure : Vacuum seal
- Heater insulation : Multi layer insulator
- Water circulation all of heater chamber
- Ar purge system : Heater & Tube inside

Hardware Specification

- Maximum temperature : 2200°C
- Process temperature range : 800 ~ 2100°C
- Temperature ramp-up rate : 50°C/min
- Wafer loading : Full automation
- Process gas : N2, Ar (optional H2)
- Wafer loading/unloading temperature : RT ~ 400°C
- Pressure range : atm ~ 5E-3 torr

System Performances

- Temperature flatzone : > 350mm
- Temperature stability : < $\pm 1.0^{\circ}\text{C}$
- Gas flow accuracy : < $\pm 1.0\%$
- Rs uniformity : < $\pm 2.0\%$

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6. Solar Cell Furnace Business

Specializing in manufacturing solar cell manufacturing furnaces that guarantees the world's best efficiency and productivity!

LP-CVD

- n-TOPCon LP-CVD
- p-TOPCon LP-CVD



ACTIVATION POCL3 DIFFUSION

- n-Type Activation
- p-Type Activation
- LP-POCL3 Diffusion



PECVD

- Vertical PE-CVD
- Horizontal PE-CVD



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6. Solar Cell Furnace Business

TOPCon LP-CVD



Items			Specification
1	Wafer	Wafer Size	M10(182mm),M12(210mm)
2	Tube	Tube Quantity	Max 12 Tube (Dual)
3	CAPA	Wafer Loading Qty	2000wafer/tube
4	Process Gas	n-TOPCon	N2, O2, SiH4, PH3
		p-TOPCon	N2, O2, SiH4, B2H6
5	Wafer & Boat Loading	Boat Loading	Cantilever Type
		Automation	Back to back loading
		Paddle	SIC Paddle
6	Heater	Flat Zone	2400mm (7zone)
		Temp Range	500~800°C
7	Hardware Performance	Temp uniformity	$\leq \pm 0.5^{\circ}\text{C}$
		Wafer breakage	0.01%
8	Process Performance	POLY Uniformity	$\pm \leq 5.0\%$
		iVOC	> 730mmV (n-TOPCon)
9	Customer	LG Solar, LONGi Solar, JA Solar, SPIC, GCL, QCELL	

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6. Solar Cell Furnace Business

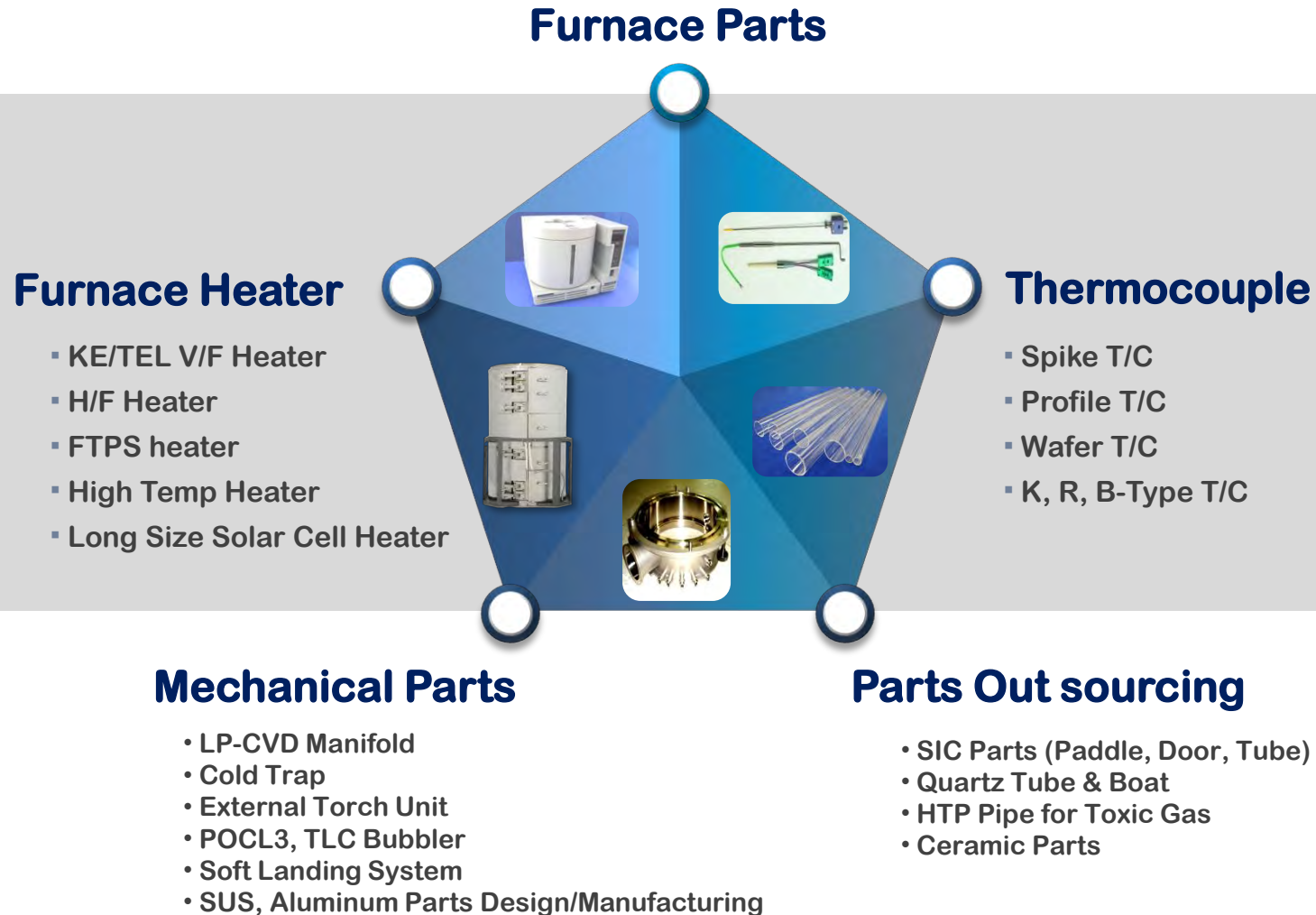
Activation



Items			Specification
1	Wafer	Wafer Size	M10(182mm),M12(210mm)
2	Tube	Tube Quantity	Max 12 Tube (Dual)
3	CAPA	Wafer Loading Qty	2000wafer/tube
4	Process Gas	Activation	N2, O2
5	Wafer & Boat Loading	Boat Loading	Soft Landing
		Automation	Back to back loading
		Paddle	SIC Paddle
6	Heater	Flat Zone	2400mm (7zone)
		Temp Range	800~1100°C
7	Hardware Performance	Temp Uniformity	$\leq \pm 0.5^{\circ}\text{C}$
		Wafer breakage	0.01%
8	Process Performance	Rs Uniformity	$\pm \leq 5.0\%$
9	Main Customer	LG Solar, LONGi Solar, KIER	

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7. Parts Business



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7. Parts Business

Furnace Heater

Vertical Heater



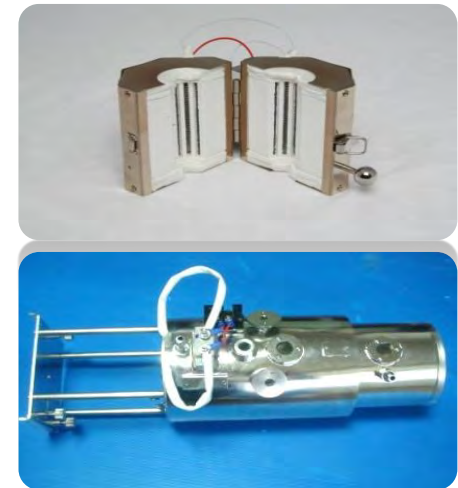
- HKE
- TEL
 - 고온 : VMU-40-007EX
 - 중온 : VMM-40-101
 - 저온 :
- ASM

Horizontal Heater



- TEMPRESS
- CENTROTERM
- THERMCO
- MRL
- BTU
- TEL

Torch Heater



- HKE
- TEL

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7. Parts Business

Thermocoupls

Profile Thermocouples for Vertical and Horizontal Furnaces

- Profile thermocouples is available in the following Pt-Rh noble metal calibrations:
- Type B, Type R and Type S – along with base metal calibrations Type K and Type N

OEM

- | | |
|--------------------|------------------------|
| • ASM® | • SVCS |
| • BTI / Tempress | • Viza / SVG / Thermco |
| • MRL | • TEL |
| • ATV Technologies | • Kokusai |
| • Centrotherm | • Tystar |

ASM



HIKE



TEL



Horizontal
Furnace



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**THANK YOU
SO MUCH!**

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