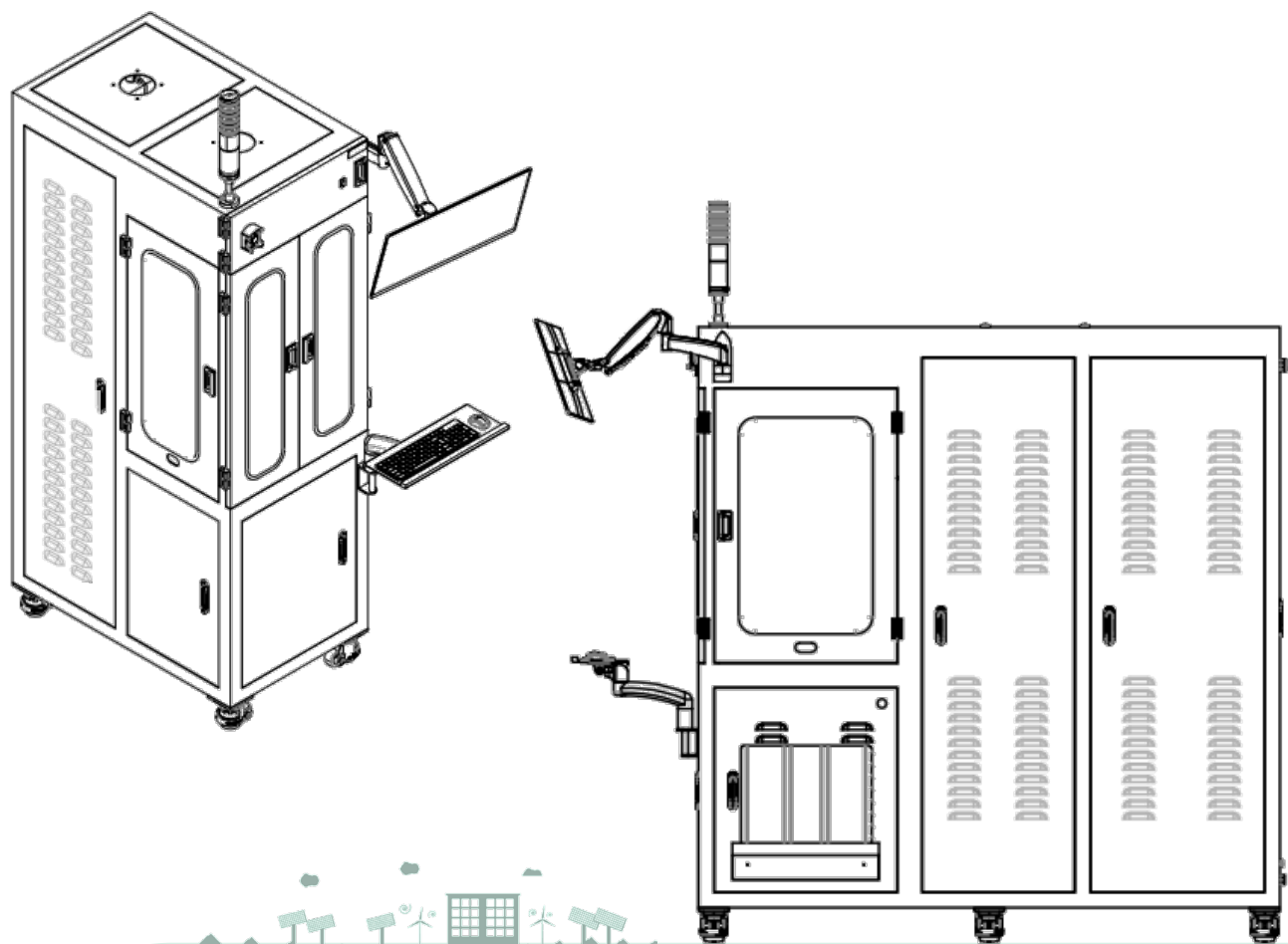
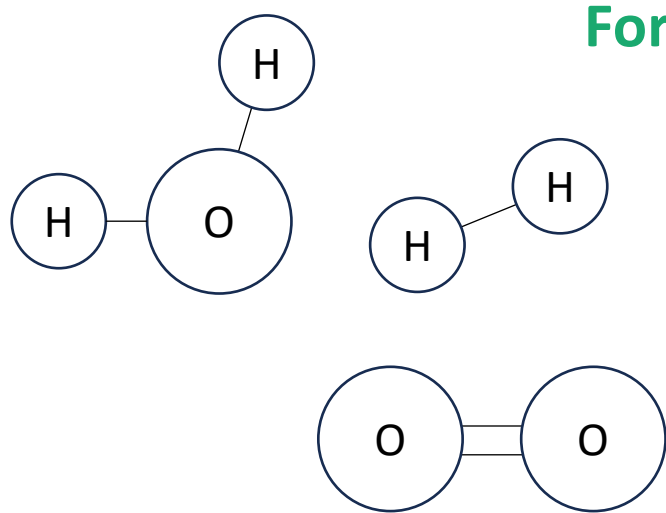


Fuel Cell & Water Electrolyzer Test Station

For the Green Energy World



Scitech Korea Inc.

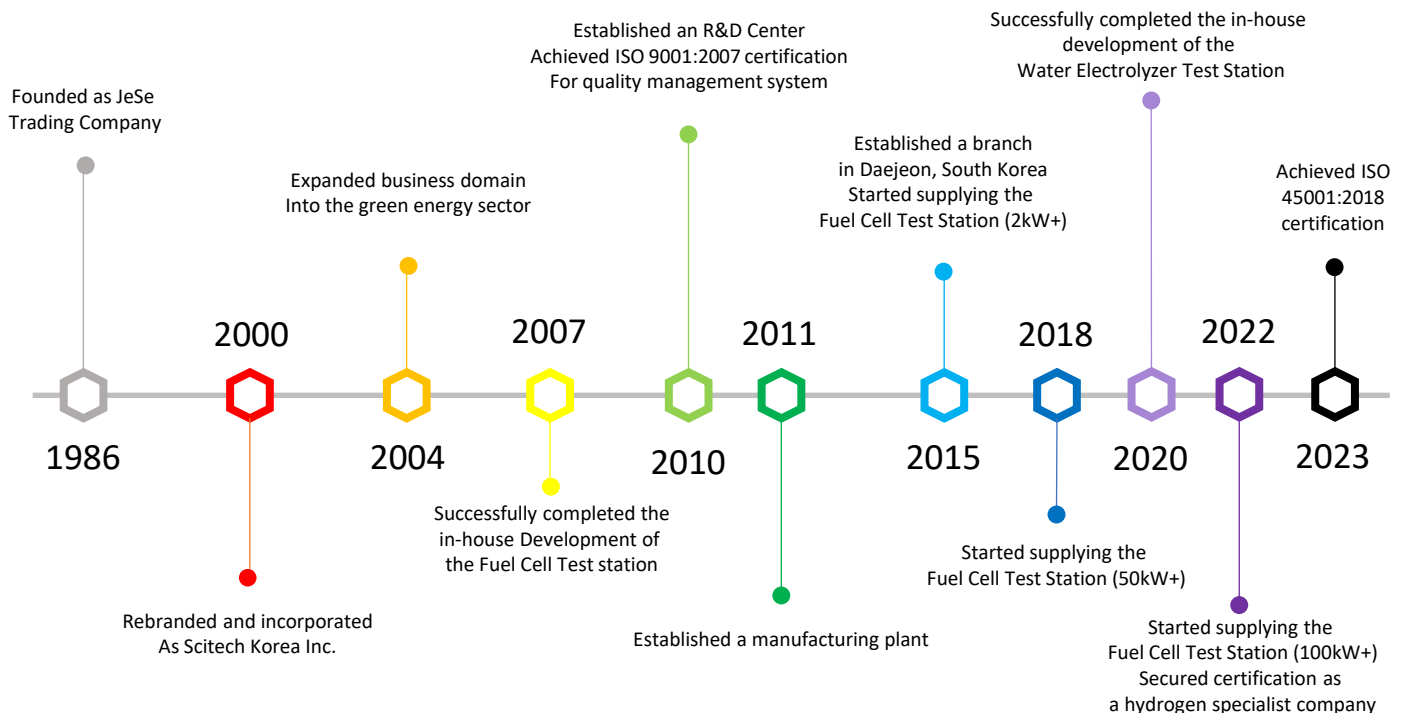
Since Scitech Korea Inc. established in 1986, it has grown amazingly over decades years thanks to our valued customers in the field of Science.

We have all the time tried to contribute to offer innovative solution to the scientists in the field of Physiology, Pharmacology, Bioscience and Neuroscience by providing with solid Lab-Instruments and software from the leading manufacturers over the world.

We pride ourselves on supporting the scientific community in Korea with accurate and powerful instruments in the highest resolution, reliable & flexible scientific information such as high confidential data, resolution and strong customer service.

Today, first of all ScitechKorea is focusing on offering the best customer service to be destined to Lifetime free service in domestic to the valued customers, which will give a full satisfaction and easy mind in using the system supplied by us.

In addition, ScitechKorea has developed successfully "Fuel Cell & Water Electrolyzer Test Station" over 2 decades, which is considered as third generation energy solution. The system has been supplied consistently to the leading manufacturers in the field of hydrogen energy and contributed a pivot role in development of the future clean energy.



Fuel Cell Test Station

Building Each Fuel Cell Stations (Single or Stack Test) by Custom Made

- PEMFC, SOFC, PAFC, HTPEMFC, DMFC, Other Application
- High Technology & Low Cost Manufacturing
- Optimizing Multi Function Operating Software by LabVIEW based
- Multi Range & Fuel Gas Supply Control
- Precisely controlled Humidifier system
- High Stability Auto Back Pressure Control
- Expandable Cell Voltage Monitoring
- Optional Embedded AC-Impedance System
- Full Automating Control for Software & Hardware
- Usable Data & Format Combability with Excel



Test Range

100W

1kW

300kW

Single

Stack



Fuel Cell Test Station - PEMFC

Single Cell

• University Type



• Laboratory Type



Model	Test Range	Dimension (mm)
SF100U-PE	100W	550 X 650 X 600

Model	Test Range	Dimension (mm)
SF100L-PE	100W	600 X 600 X 1800
SF300L-PE	300W	600 X 700 X 1800
SF600L-PE	600W	800 X 900 X 1800

Model	Test Range	Dimension (mm)
SF100-PE	100W	600 X 950 X 2000
SF300-PE	300W	600 X 1100 X 2000
SF600-PE	600W	800 X 1200 X 2000



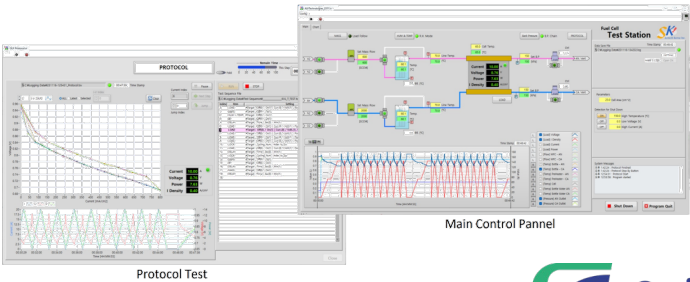
Specifications

Item		SF100	SF300	SF600
Gas Flow Control (slpm)	Anode	1	3	6
	Cathode	5	15	30
	N ₂ Purge	N2 MFC Anode, Cathode		
	MFC Control	Turndown 100:1		
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available		
Humidification	Humidifier	Gas Temperature Control: RT~95°C,		
		Dewpoint Control: RT up to 95°C		
		Wet & Dry(Bypass) Auto Control		
	Line Heater	Flexible line heating, Direct gas temperature control		
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap & Gas Split)		
Cell Heating & Cooling	Air Cooling	Cell Heating & Air Cooling		
	Water Cooling	Water Circulation System(Heating & Cooling Control)		
Back Pressure Control		Auto Back Pressure Control, max 3.5bar		
Cell Voltage Monitoring(Optional)		Optional 5 or 10 cell ±5V/Ch		
AC-Impedance (Option)		Single Cell AC-Impedance measurement, 10mHz~10KHz		

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station - PEMFC

Stack (1~20kW)



Model	SF1K-PE	SF2K-PE	SF3K-PE	SF5K-PE	SF7K-PE	SF10K-PE	SF20K-PE
Test Range	1kW	2kW	3kW	5kW	7kW	10kW	20kW
Dimension (mm)	900 X 1600 X 2000			1100 X 1800 X 2000			1200 X 2200 X 2000



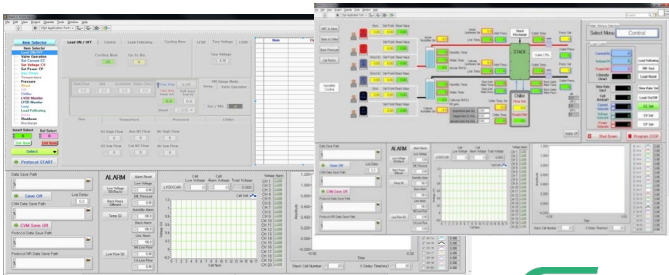
Specifications

Item		SF1K	SF2K	SF3K	SF5K	SF7K	SF10K	SF20K
Gas Flow Control (slpm)	Anode	20	40	60	100	130	200	400
	Cathode	70	140	210	350	450	700	1400
	N ₂ Purge	N2 MFC Anode, Cathode						
	MFC Control	Turndown 100:1						
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available						
Humidification	Humidifier	Gas Temperature Control: RT~95°C,						
		Dewpoint Control: RT up to 95°C						
		Wet & Dry(Bypass) Auto Control						
	Line Heater	Flexible line heating, Direct gas temperature control						
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap & Gas Split)						
Cell Heating & Cooling	Air Cooling	Cell Heating & Air Cooling						
	Water Cooling	Water Circulation System(Heating & Cooling Control)						
Back Pressure Control		Auto Back Pressure Control, max 3.5bar						
Cell Voltage Monitoring		up to 1000channels, ±5V/Ch						
AC-Impedance (Option)		Single AC-Impedance or Multi Channel (Max 30CH) HFR measurement, 10mHz~10KHz						

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station - PEMFC

Stack (25~300kW)



Model	SF25K-PE	SF30K-PE	SF50K-PE	SF100K-PE	SF150K-PE	SF200K-PE	SF250K-PE	SF300K-PE
Test Range	25kW	30kW	50kW	100kW	150kW	200kW	250kW	300kW
Dimension (mm)	1400 X 2500 X 2000		1500 X 3300 X 2000		1700 X 4500 X 2200		2000 X 6000 X 2200	



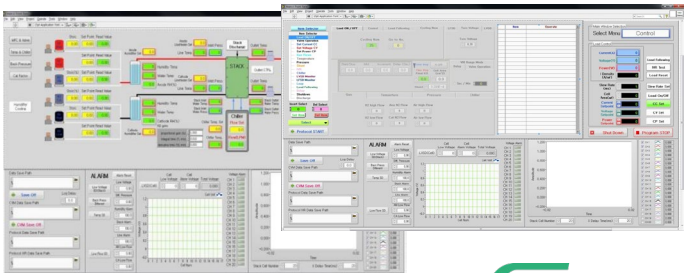
Specifications

Item		SF25K	SF30K	SF50K	SF100K	SF150K	SF200K	SF250K	SF300K
Gas Flow Control (slpm)	Anode	500	600	1000	2000	3000	4000	5000	6000
	Cathode	1800	2100	3500	7000	11000	15000	19000	22000
	N ₂ Purge	N2 MFC Anode, Cathode							
	MFC Control	Turndown 100:1							
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available							
Humidification	Humidifier	Gas Temperature Control: RT~95°C,							
		Dewpoint Control: RT up to 95°C							
		Wet & Dry(Bypass) Auto Control							
	Line Heater	Flexible line heating, Direct gas temperature control							
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap & Gas Split)							
Cell Heating & Cooling	Air Cooling	Cell Heating & Air Cooling							
	Water Cooling	Water Circulation System(Heating & Cooling Control)							
Back Pressure Control		Auto Back Pressure Control, max 3.5bar							
Cell Voltage Monitoring		up to 1000channels, ±5V/Ch							
AC-Impedance (Option)		Single AC-Impedance or Multi Channel (Max 30CH) HFR measurement, 10mHz~10KHz							

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station – HTPEMFC

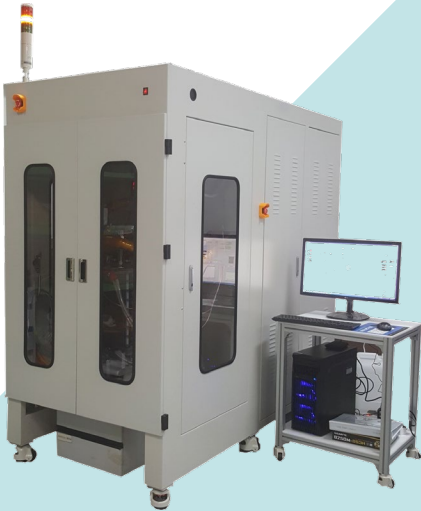
High Temperature PEMFC Test

Single

Model	SF100-HP	SF300-HP	SF600-HP
Test Range	100W	300W	600W
Dimension	600 X 950 X 2000		

Stack

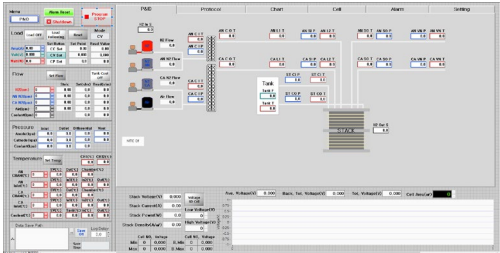
Model	SF1K-HP	SF3K-HP	SF5K-HP	SF20S-HP	SF25K-HP	SF30K-HP	SF50K-HP
Test Range	1kW	3kW	5kW	20kW	25kW	30kW	50kW
Dimension	Custom						



Specifications

Item		Single	Stack
Gas Flow Control (slpm)	Anode	1 ~ 6	20 ~ 1000
	Cathode	5 ~ 30	70 ~ 3500
	N ₂ Purge	N2 MFC Anode, Cathode	
	MFC Control	Turndown 100:1	
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available	
Humidification (Option)	Humidifier	Gas Temperature Control: RT~95°C,	
		Dewpoint Control: RT up to 95°C	
		Wet & Dry(Bypass) Auto Control	
Line Heater		Flexible line heating, Direct gas temperature control, Max 220°C	
Cell Heating (Max 220°C) & Cooling	Air Cooling	Cell Heating & Air Cooling	
	Liquid Cooling	Liquid Circulation System(Heating & Cooling Control)	
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap &Gas Split)	
Back Pressure Control		Auto Back Pressure Control, max 3.5bar	
Cell Voltage Monitoring(Optional)		up to 1000channels, ±5V/Ch	
AC-Impedance (Option)		Single AC-Impedance measurement, 10mHz~10KHz	

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software

Fuel Cell Test Station – PAFC

Phosphoric Acid Fuel Cell Test

Single

Model	SF100-PA	SF300-PA	SF600-PA
Test Range	100W	300W	600W
Dimension	600 X 950 X 2000		



Stack

Model	SF1K-PA	SF3K-PA	SF5K-PA	SF20S-PA	SF30K-PA	SF50K-PA	SF100K-PA
Test Range	1kW	3kW	5kW	20kW	30kW	50kW	100kW
Dimension	Custom						



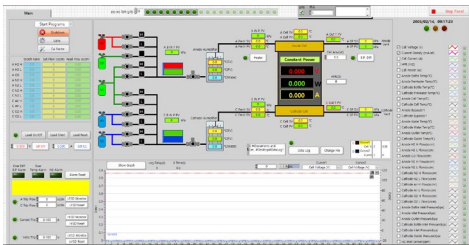
Specifications

Item		Single	Stack
Gas Flow Control (slpm)	Anode	1 ~ 6	20 ~ 1000
	Cathode	5 ~ 0	70 ~ 3500
	N ₂ Purge	N2 MFC Anode, Cathode	
	MFC Control	Turndown 100:1	
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available	
Humidification (Option)	Humidifier	Gas Temperature Control: RT~95°C,	
		Dewpoint Control: RT up to 95°C	
		Wet & Dry(Bypass) Auto Control	
Line Heater		Flexible line heating, Direct gas temperature control, Max 250°C	
Cell Heating (Max 250°C) & Cooling	Air Cooling	Cell Heating & Air Cooling	
	Liquid Cooling	Liquid Circulation System(Heating & Cooling Control)	
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap &Gas Split)	
Back Pressure Control		Auto Back Pressure Control, max 3.5bar	
Cell Voltage Monitoring(Optional)		up to 1000channels, ±5V/Ch	
AC-Impedance (Option)		Single AC-Impedance measurement, 10mHz~10KHz	

Software

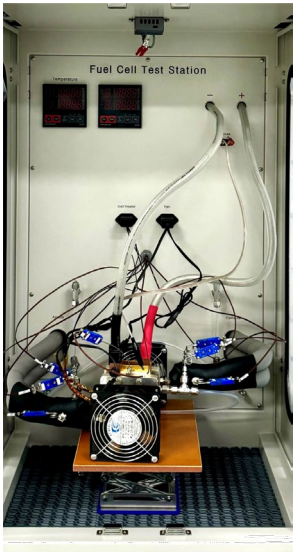


Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station – Special Test

Wet & Dry Test



Model	Test Range	Dimension (mm)
SFN-PEWD	Single Cell	600 X 950 X 1960



Specifications

Item		Wet & Dry Test Station		
Gas Flow Control (slpm)		H2	N2	Air
	Anode	2	2	2
	Cathode	2	2	2
	N ₂ Purge	N2 MFC Anode, Cathode		
	MFC Control	Turndown 100:1		
Wet	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available		
	Humidifier	Gas Temperature Control: RT~95°C		
		Dewpoint Control: RT up to 95°C		
		Wet & Dry(Bypass) Auto Control		
	Wet Line Heater	Flexible line heating, Direct gas temperature control		
Dry	Option	Additional Humidifier & Line heater (to make different RH)		
	Dry Gas Line Heater	Gas Temperature Control: RT~95°C Flexible line heating, Direct gas temperature control		
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap & Gas Split)		
Cell Heating & Cooling	Air Cooling	Cell Heating & Air Cooling		
	Water Cooling	Water Circulation System(Heating & Cooling Control)		
Back Pressure Control		Auto Back Pressure Control, max 3.5bar		
Cell Voltage Monitoring		Option 2ch		
AC-Impedance (Option)		Single Cell AC-Impedance measurement, 10mHz~10KHz		

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software

Fuel Cell Test Station – Special Test

OCV Durability(Drive Cycle) Test - PEMFC, PAFC



Model	Test Range (w)	Dimension (mm)
SF□ N - PEOD - (□CH)	Single Cell	Custom
SF□ N - PAOD - (□CH)		



Specifications

Item		SF100	SF300	SF600
Chennel		1 ~ 3 CH		
Gas Flow Control (slpm)	Anode	1	3	6
	Cathode	5	15	30
	N ₂ Purge	N2 MFC Anode, Cathode		
	MFC Control	Turndown 100:1		
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available		
Humidification	Humidifier	Gas Temperature Control: RT~95°C		
		Dewpoint Control: RT up to 95°C		
		Wet & Dry(Bypass) Auto Control		
	Line Heater	Flexible line heating, Direct gas temperature control, (Option : High Temp)		
Exhausted Gas Cooling		Exhausted gas cooling and Trap(Condensation Water Trap &Gas Split)		
Cell Heating (option high temp) & Cooling	Air Cooling	Cell Heating & Air Cooling		
	Water Cooling	Water(Liquid) Circulation System(Heating & Cooling Control)		
Back Pressure Control		Auto Back Pressure Control, max 3.5bar		
Multi Cell Voltage Monitoring (Option)		5 or 10 cell ±5V/Ch		
HFR Monitoring (Option)		1 kHz resistance		

Software

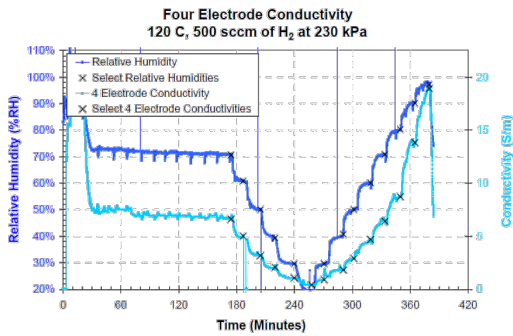
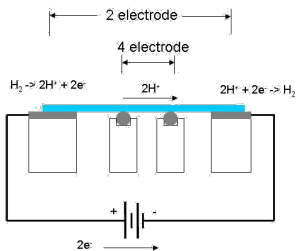
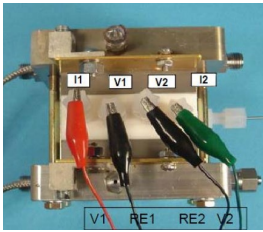


Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station – PEMFC Special Test

Membrane Conductivity Test System



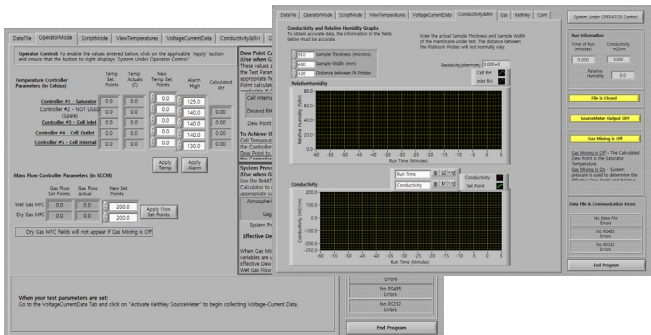
Model	SFNU - PECD
Test Item	Membrane Conductivity Test
Feature	Real Time Conductivity Measurement @RH 20~100%
Case Type	Bench Top (550 X 500 X 630 mm)

Specifications

Item		SFNU - PECD
Gas Flow Control	H ₂ , N ₂ (Wet)	1000 sccm
	H ₂ , N ₂ (Dry)	1000 sccm
	MFC Control	Turndown 100:1
Humidification	Saturator	Gas Temperature(Dew Point) RT~95°C Dewpoint Control: RT~95°C Wet & Dry(Bypass) Manual DI Water Auto Fill
	Line Heater	Flexible line heating, Direct gas temperature control
Source Meter		Capability min ±10pA / max ±1.05A, min ±1μV / ±max 21V
Back Pressure Control		Back Pressure Regulator & Gauge, max 3bar
Conductivity Cell		FCT 5cm2 Cell Hardware - End Plate, Graphite block, Heater Conductivity Cell -Teflon Cell with 4Pt Electrode Wire

Software

Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station – DMFC

Direct Methanol Fuel Cell Test

● Single

Model	SF50-DM	SF200-DM
Test Range	50W	200W
Dimension	700 X 950 X 2000	



● Stack

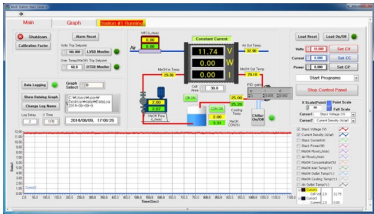
Model	SF300-DM	SF500-DM	SF1K-DM	SF2K-DM	SF3K-DM	SF5K-DM
Test Range	300W	500W	1000W	2000W	3000W	5000W
Dimension	Custom					



Specifications

Item		SF50	SF200	SF300	SF500	SF1K	SF2K	SF3K	SF5K
Methanol Supply	Anode (sccm)	30	120	180	300	600	1200	1800	3000
Cathode Air Flow Control	Cathode – Air (slpm)	4	16	24	40	80	160	240	400
	MFC Control	Turndown 100:1							
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available							
N ₂ Purge		N2 MFC Anode, Cathode							
Humidification (Option)	Humidifier	Gas Temperature Control: RT~95°C,							
		Dewpoint Control: RT~95°C							
		Wet & Dry(Bypass) Auto Control							
Line Heater		Flexible line heating, Direct fuel temperature control							
Cell Heating & Cooling		Cell Heater(single cell), Heated methanol supply							
Exhausted Gas Cooling (Cathode)		Exhausted gas cooling and Trap(Condensation Water Trap &Gas Split)							
Back Pressure Control(Option : Cathode)		Auto Back Pressure Control, max 3.5bar							
Cell Voltage Monitoring(Option)		up to 200channels, ±5V/Ch							
AC-Impedance (Option)		Single AC-Impedance measurement, 10mHz~10KHz							
Methanol circulation system		Methanol concentration auto control system - Methanol mix tank(Temperature control) - Methanol return & supply port - Methanol concentration sensor - DI water supply							

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software

Fuel Cell Test Station - SOFC

Single Cell



Model	SF50U-SO	SF50L-SO	SF100L-SO	SF300-SO
Test Range	Button Cell, 50W	Planar Cell, 50,100W		Large Area Planar Cell, 300W
Case Type	Bench Top (Case : 400 X 500 X 550 Option : 500 X 550 X 600)	Standing (600 X 700 X 1800 mm)		Standing (800 X 1200 X 2000 mm)



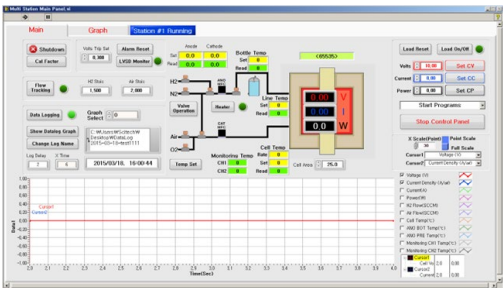
Specifications

Item		SF50U-SO	SF50L-SO	SF100L-SO	SF300-SO
Gas Flow Control (sccm)	Anode	200	200	500	3000
	Cathode	600	600	1500	10000
	N ₂ Purge	N2 MFC Anode, Cathode			
	MFC Control	Turndown 100:1			
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available			
Furnace		Vertical Tube Furnace	Box Furnace or Custom		
		Max 1000°C, Heating rate & Cooling rate control (°C/min)			
Humidification (Option)	Humidifier	Gas Temperature Control: RT~95°C,			
		Dewpoint Control: RT~95°C			
		Wet & Dry(Bypass) Auto Control			
Cell Loading Pressure Control (Option)		Spring load	1) Auto pressure control (gas cylinder), Max 30bar 2) Servo Motor Pressure Control & Load Cell Unit (1ton) Pressure loading ceramic pole		
Cell Jig (Option)		Alumina Tube & Holder Set (Button Cell)	Metal(Inconel) bipolar plate set (planar cell)		

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station - SOFC

Stack



Model	SF500-SO	SF1K-SO	SF5K-SO	SF10K-SO	SF25K-SO
Test Range	500W	1kW	5kW	10kW	25kW
Case Type	Standing (800 X 1300 X 2000 mm)	Standing (800 X 1500 X 2000 mm)	Standing (1000 X 1800 X 2000 mm)	Standing (1200 X 2000 X 2000 mm)	Custom



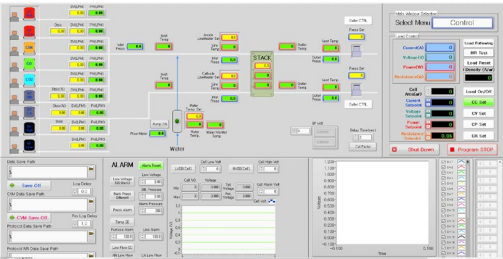
Specifications

Item		SF500-SO	SF1K-SO	SF5K-SO	SF10K-SO	SF25K-SO
Gas Flow Control (slpm)	Anode (H ₂)	10	20	100	200	500
	Cathode (Air)	35	70	350	700	1750
	N ₂ Purge	N2 MFC Anode, Cathode				
	MFC Control	Turndown 100:1				
	Additional MFC & Gas	Multi Gas (CH ₄ , CO, CO ₂ , NH ₃ , etc...) Gas Mixing, Multi Range Control Available				
Furnace		Box Furnace, Max 900°C				
		Front 2 door full open (Half area open of furnace) or Custom				
Humidification (Option)	Evaporator	DI water supply pump & flow meter(flow control)				
		Heating Chamber, ~200°C				
Line Heater (Option)		High temp line(direct gas) heating, max 600°C				
Cell Loading Pressure Control (Option)		Auto pressure control Servo Motor control unit, max 1000kgf Pressure loading ceramic pole & load cell unit				
Exhausted Gas Cooling (Option)		Exhausted gas cooling(Air cooling radiator or water cooling heat exchanger)				
Back Pressure Control (Option)		Auto Back Pressure Control, max 3.5bar				

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Fuel Cell Test Station – SOFC Special Test

Conductivity Test

※ SFL - (□CH) - CDSO



MTC

MFC & Temperature(Furnace) Controller

※ SFU - MTSO



Model	SFNL - SOCD - (□CH)	SFNU - SOMT
Test Item	Electrode Materials	MFC Control (Max 6CH) Temperature Control
Case Type	Laboratory Type (1000 X 600 X 2000 mm)	Bench Top Case Type (400 X 300 X 150 mm)



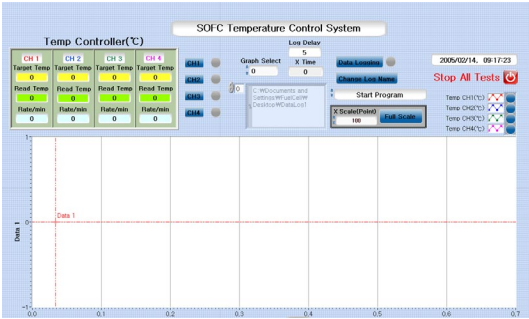
Specifications

Item		SFNL - SOCD - (□CH)	SFNU - SOMT
Gas Flow Control	Anode	H ₂ , Air – 500 sccm	H ₂ , Air – 1000 sccm or Selective
	Cathode	H ₂ , Air – 500 sccm	H ₂ , Air – 1000 sccm or Selective
	N ₂ Purge	N2 MFC Anode, Cathode	
	MFC Control	Turndown 100:1	
	Additional MFC & Gas	Gas Mixing, Multi Gas, Multi Range Control Available	
Furnace (Option)		Horizontal Tube Furnace	
		Max 1000°C, Heating rate & Cooling rate control (°C/min)	
Source Meter		Capability min ±10pA / max ±1.05A, min ±1μV / max ±21V	-
Humidification (Option)	Humidifier	Gas Temperature Control: RT~95°C,	
		Dewpoint Control: RT~95°C	
		Wet & Dry(Bypass) Auto Control	

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

Building Each Water Electrolyzer Test Stations (Single or Stack Test) by Custom Made

- PEM, Alkaline, AEM, HTPEM, SOEC, Ammonia EC, Other Application
- High Technology & Low Cost Manufacturing
- Optimizing Multi Function Operating Software by LabVIEW based
- Water- Gas Separation, Dry & Filtering Unit
- In-Line Cross-Overed H₂, O₂ Concentration Monitoring
- Generated O₂&H₂ Gas-Water Separation, Flow Monitoring
- High Stability Auto High Back Pressure Control
- Optional Integrated AC-Impedance System
- Full Automating Control for Software & Hardware
- Usable Data & Format Combability with Excel

PEM



System Configuration

- DC Power Supply
- Mass Flow Meter (H₂, O₂)
- Gas Concentration Sensor (H₂, O₂)
- Auto N₂ Purge System
- Water Circulation System (Tank, Pump, Flowmeter, Filter)
- Electrolyte Circulation (Anode & Cathode: Tank, Pump, Flowmeter)
- Automatic Water Fill (High Pressure) & Filter
- Temperature Control & Monitoring
- Preheater (Line Heater)
- Auto Back Pressure Control & Monitoring
- Ultrapure Water Generation System
- HFR Meter
- Dewpoint Monitoring

- Dryer
- Gas Condensation (Heat Exchanger)
- Gas-Water Separator
- Filtering, Bubble Trap
- Gas Sampling Port, Fittings, Valve, Pipes
- Safety, H₂ Leak Alarm, Shutdown Logic
- Auto Control & DAQ Hardware
- Operating Software Programming
- Floor Standing & Housing Cabinet
- Optional integrated AC-Impedance system

Alkaline



AEM



Water Electrolyzer Test Station

PEM



< Single Cell Test station >



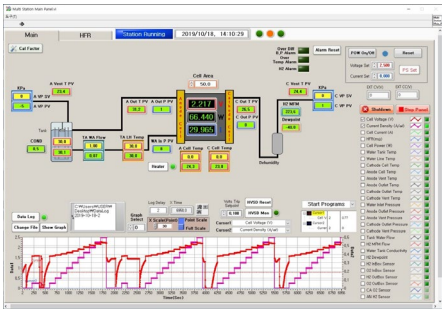
Specifications

Item		SE300 - PE	SE500 - PE	SE1K - PE	SE3K - PE	SE5K - PE	SE10K - PE	SE30K - PE	SE50K - PE	SE100K - PE	SE200K - PE
Test Rane		300W	500W	1kW	3kW	5kW	10kW	30kW	50kW	100kW	200kW
Station Dimension (mm)		600 X 1100 X 2000		800 X 1300 X 2000		1100 X 1800 X 2000		1400 X 2200 X 2000		1500 X 3000 X 2200	1800 X 4000 X 2200
Gas Flow Measure	H ₂ Flow (slpm)	1	2	5	15	25	50	150	250	500	1000
	O ₂ Flow (slpm)	0.5	1	2.5	7.5	12	25	75	125	250	500
	MFM Rrage	Measuring Range : Turndown 100:1									
N ₂ Purge		Auto N ₂ Purge MFC : Anode, Cathode									
Electrolyte Circulation (Anode)		DI Water Temperature Control : RT ~95°C, DI Water Level Control & Alarm, Auto Fill, Water Conductivity Monitoring DI Water & Gas Separation DI Water Flow Control (Pump & Flow Meter), Water Filtering (micro & ion)									
Gas Cooling		Gas cooling and Trap(Condensation liquid & gas separation)									
Dryer, Gas Filter		Dryer(Moisture Absorb Filter) & Dewpoint Monitoring, or other type Gas Filter									
Concentration Sensor	H ₂ in O ₂	0-5%, 10% Vol									
	O ₂ in H ₂	0-5%, 10% Vol									
Back Pressure Control		Auto Back Pressure Control, 10Bar, 30Bar(option)									
Cell voltage Monitoring		Nominated Channel, ±5V/CH									
AC-Impedance(Optional)		Single Cell AC-Impedance, HFR, Multi Channel HFR measurement, 10mHz~10kHz									

Software

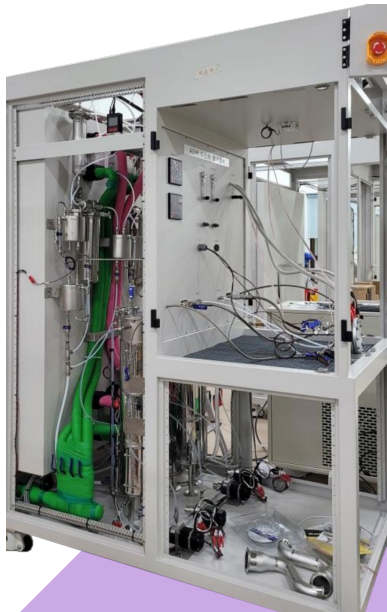


Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

AEM



< Single Cell Test station >



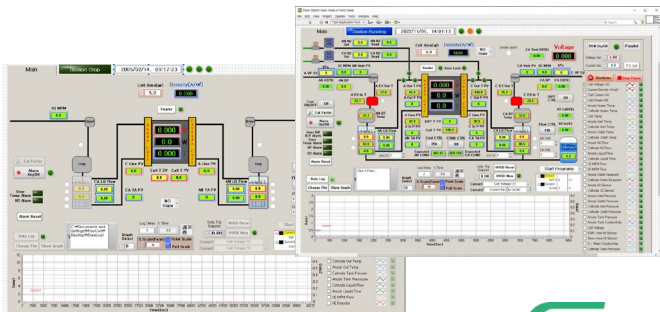
Specifications

Item		SE300 - AE	SE500 - AE	SE1K - AE	SE3K - AE	SE5K - AE	SE10K - AE	SE30K - AE	SE50K - AE	SE100K - AE	SE200K - AE
Test Rane		300W	500W	1kW	3kW	5kW	10kW	30kW	50kW	100kW	200kW
Station Dimension (mm)		600 X 1100 X 2000		800 X 1300 X 2000		1100 X 1800 X 2000		1400 X 2200 X 2000		1500 X 3000 X 2200	1800 X 4000 X 2200
Gas Flow Measure	H ₂ Flow (slpm)	1	2	5	15	25	50	150	250	500	1000
	O ₂ Flow (slpm)	0.5	1	2.5	7.5	12	25	75	125	250	500
	MFM Range	Measuring Range : Turndown 100:1									
N ₂ Purge		Auto N ₂ Purge MFC : Anode, Cathode									
Electrolyte Circulation (Anode & Cathode)		Liquid Temperature Control : RT ~95°C, Liquid Level Control & Alarm, Auto Fill (option) Liquid & Gas Separation Liquid Flow Control (Pump & Flow Meter)									
Gas Cooling		Gas cooling and Trap(Condensation liquid & gas separation)									
Dryer, Gas Filter		Dryer(Moisture Absorb Filter) & Dewpoint Monitoring, or Alkalinity Gas Filter									
Concentration Sensor	H ₂ in O ₂	0-5%, 10% Vol									
	O ₂ in H ₂	0-5%, 10% Vol									
Back Pressure Control		Auto Back Pressure Control, 10Bar, 30Bar (option)									
Cell voltage Monitoring		Nominated Channel, ±5V/CH									
AC-Impedance(Optional)		Single Cell AC-Impedance, HFR, Multi Channel HFR measurement, 10mHz~10kHz									

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

Alkaline



< Single Cell Test station >



< Stack Test station >



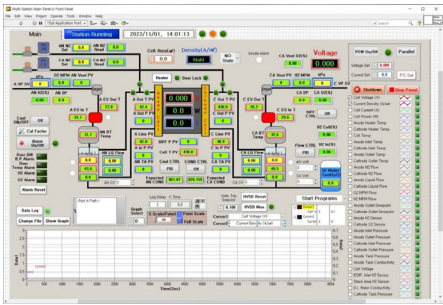
Specifications

Item		SE300 - AL	SE500 - AL	SE1K - AL	SE3K - AL	SE5K - AL	SE10K - AL	SE30K - AL	SE50K - AL	SE100K - AL	SE200K - AL
Test Rane		300W	500W	1kW	3kW	5kW	10kW	30kW	50kW	100kW	200kW
Station Dimension (mm)		600 X 1100 X 2000		800 X 1300 X 2000		1100 X 1800 X 2000		1400 X 2200 X 2000		1500 X 3000 X 2200	1800 X 4000 X 2200
Gas Flow Measure	H ₂ Flow (slpm)	1	2	5	15	25	50	150	250	500	1000
	O ₂ Flow (slpm)	0.5	1	2.5	7.5	12	25	75	125	250	500
	MFM Range	Measuring Range : Turndown 100:1									
N ₂ Purge		Auto N ₂ Purge MFC : Anode, Cathode									
Electrolyte Circulation (Anode & Cathode)		Liquid(KOH30%) Temperature Control : RT ~95°C, Liquid Level Control & Alarm, Auto Fill (option) Liquid & Gas Separation Liquid Flow Control (Pump & Flow Meter)									
Gas Cooling		Gas cooling and Trap(Condensation liquid & gas separation)									
Dryer, Gas Filter		Dryer(Moisture Absorb Filter) & Dewpoint Monitoring, Alkaline Gas Filter									
Concentration Sensor	H ₂ in O ₂	0-5%, 10% Vol									
	O ₂ in H ₂	0-5%, 10% Vol									
Back Pressure Control		Auto Back Pressure Control, 10Bar, 30Bar (option)									
Cell voltage Monitoring		Nominated Channel, ±5V/CH									

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

PEM & Alkaline(or AEM)



< Stack Test station >



< Single Cell Test station >



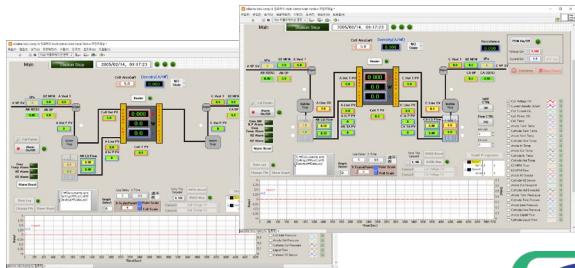
Specifications

Item		SE300 - PEAL	SE500 - PEAL	SE1K - PEAL	SE3K - PEAL	SE5K - PEAL	SE10K - PEAL	SE30K - PEAL	SE50K - PEAL	SE100K - PEAL	SE200K - PEAL
Test Rane		300W	500W	1kW	3kW	5kW	10kW	30kW	50kW	100kW	200kW
Station Dimension (mm)		600 X 1100 X 2000		800 X 1300 X 2000		1100 X 1800 X 2000		1400 X 2200 X 2000		1500 X 3000 X 2200	1800 X 4000 X 2200
Gas Flow Measure	H ₂ Flow (slpm)	1	2	5	15	25	50	150	250	500	1000
	O ₂ Flow (slpm)	0.5	1	2.5	7.5	12	25	75	125	250	500
	MFM Rrage	Measuring Range : Turndown 100:1									
N ₂ Purge		Auto N ₂ Purge MFC : Anode, Cathode									
Electrolyte Circulation	PEM (Anode)	DI Water Temperature Control : RT ~95°C, DI Water Level Control & Alarm, Auto Fill, Water Conductivity Monitoring DI Water & Gas Separation DI Water Flow Control (Pump & Flow Meter), Water Filtering (micro & ion)									
	ALK(or AEM) (Anode & Cathode)	Liquid(KOH30%) Temperature Control : RT ~95°C, Liquid Level Control & Alarm, Auto Fill (option) Liquid & Gas Separation Liquid Flow Control (Pump & Flow Meter)									
Gas Cooling		Gas cooling and Trap(Condensation liquid & gas separation)									
Dryer, Gas Filter		Dryer(Moisture Absorb Filter) & Dewpoint Monitoring, or other type Gas Filter									
Concentration Detection	H ₂ in O ₂	0-5%, 10% Vol									
	O ₂ in H ₂	0-5%, 10% Vol									
Back Pressure Control		Auto Back Pressure Control, 10Bar, 30Bar (option)									
Cell voltage Monitoring		Nominated Channel, ±5V/CH									
AC-Impedance(Optional)		Single Cell AC-Impedance, HFR, Multi Channel HFR measurement, 10mHz~10kHz									

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

SOEC



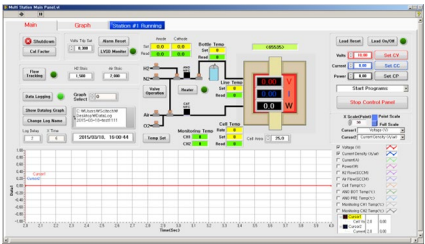
Specifications

Item		SE100 - SO	SE300 - SO	SE500 - SO	SE1K - SO	SE5K - SO	SE10K - SO	SE30K - SO
Test Range		100W	300W	500W	1kW	5kW	10kW	30kW
Station Dimension (mm)		600 X 700 X 1800	700 X 900 X 1800	800 X 1300 X 2000		1000 X 1800 X 2000		Custom
Gas Flow Measure	H ₂ Flow (slpm)	0.3	1	2	5	25	50	150
	O ₂ Flow (slpm)	0.2	0.5	1	2.5	12	25	75
	MFM Range	Measuring Range : Turndown 100:1						
N ₂ Purge		Auto N ₂ Purge MFC : Anode, Cathode						
Furnace		Box Furnace, Max 900°C						
Evaporator		Front 2 door full open (Half area open of furnace) or Custom						
Line Heater		DI water supply pump & flow meter(flow control)						
Cell Loading Pressure Control (Option)		Heating Chamber, ~200°C						
Exhausted Gas Cooling (Option)		High temp line(direct gas) heating, max 600°C						
Back Pressure Control (Option)		Auto pressure control Servo Motor control unit, max 1000kgf Pressure loading ceramic pole & load cell unit						
Exhausted Gas Cooling (Option)		Exhausted gas cooling(Air cooling radiator or water cooling heat exchanger)						
Back Pressure Control (Option)		Auto Back Pressure Control, max 3.5bar						

Software



Variable & Usable Testing Programs
Optimizing Multi Function Software



Water Electrolyzer Test Station

Other Electrolyzer Test

- Water Electrolysis Applications (Ammonia, etc...)

Feature

DC Power for Single Cell, Stack, High Current
Electrolyte(Ammonia, etc...) Supply & Auto Fill
Electrolyte Circulation System (Anode & Cathode)
- Flow Control
- Water Gas Separator
- Water Temperature Control (Heating and Cooling)
H₂, O₂ MFM
H₂, O₂ Concentration Sensor
Water Gas Separator
N₂ Purge System
Dryer, Trap, Filter
Dewpoint Monitoring, Gas Filter
10bar or High Pressure Control (Auto Pressure Control)
Full Automation Software Control



CO₂ Conversion Test Station

CO₂ Conversion (Reduction)



Feature

- DC Power(or Load) for Single Cell, Stack, High Current
- CO₂ Supply MFC
- CO₂ Humidifier
- Electrolyte Circulation System
 - Flow Control
 - Liquid Temperature Control (Heating and Cooling)
 - Gas & Liquid Separation
- CO₂ MFM
- CO, O₂, CO₂ Concentration Sensor
- Dryer, Dewpoint Monitoring
- N₂ Auto Purge System
- 10bar Control (Auto Pressure Control)
- Full Automation Software Control

< Single Cell Test station >

Test Range

300W

200kW



< High Power CO₂ Conversion Stack Test station >

Redox Flow Battery Test Station

Redox Flow Battery



Feature

- Electric Charge & Discharge Module
 - DC Load and Power Supply Control
- Electrolyte Tank (PE)
 - Full Drain Inductor Tank
- Electrolyte Pump (PVDF Impeller)
- Flow Meter (PVDF)
- Cell Voltage Monitoring
- Temp Monitoring (PTFE)
- Heat Exchange (Plastic Materials)
- CPVC Pipe
- Pressure Sensor (PTFE)
- Full Automation Control Software

< Single Cell & Stack Test station >

Test Range

5kW

30kW



< 5kW Test Station With Temperature Chamber>



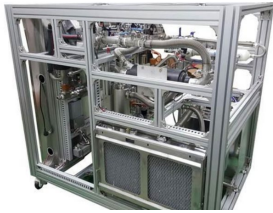
< 30kW Test Station>

Fuel Cell Test Station

BOP Test Bench

Detail

Prototype System



Fuel Cell 15kW~200kW Test System
H₂ Recirculation System
Air Blower and Control
Stack Liquid Circulation (Heating& Cooling) Sys
Humidifier and Self Humidity System
Auto Back Pressure Control
Dead-End Operation

Detail

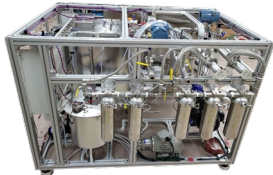
Air Blower Test



Air Compressor & Blower 100~200kW Test
Soundproof Facility
Control Power Supply
Water Cooling System for Blower
Mass Flow Meter
Auto Back Pressure Control

Detail

Cooling Water Pump & Module Test



Liquid Pump Test (Max Flow 500 lpm)
Pump RPM Control
Liquid Flow Meter
Filter Set (Ion & Micro Filter)
Option – Environment Chamber

Detail

H₂ Recirculation Test



H₂ Supply & Flow Meter, 10~200kW Test
H₂ Humidifier System
H₂ Recirculation Blower or Ejector Test
H₂ Recirculation Flow Measurement
H₂ Recirculation Concentration Monitoring
H₂ Supply & Purge Valve
Gas Water Separator

Detail

Humidifier Test Bench



Gas to Gas Humidity Test System
Flow Max 8000LPM Control
Noncontact Humidity Sensor
Auto Back Pressure Control
High Speed Temperature Control and Stability

Fuel Cell Test Station

Reformer Test



Detail

5kW Stream Reformer Test
LPG and Stream Flow Control
Preheater
Reformer Heating Control

Module Control & Measurement

DAQ Monitoring



Detail

- Pressure, Temperature, Flow, Humidity Data Real Time Monitoring
- Multichannel System

MFC Controller



Detail

- Multi-Channel MFC Control Max 250°C Test
- 4Ch, 8Ch, 16Ch
- Auto Operating Software

Dew Point Measurement



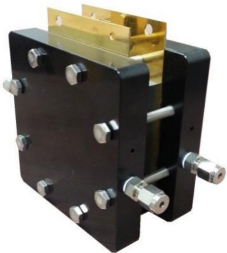
Detail

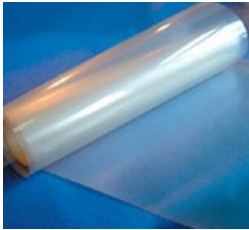
- Non-Contact Laser Absorption Spectroscopy Detector
- Dew Point Range: 30.0°C to 100.0°C
- Range: 40mB to 1000mB Water Vapor Partial Pressure (30°C to 100°C Dew Point)
- Accuracy: +/-2% of the Reading in Millibars
+1millibar, or +/-0.5°C Dew Point
- Max Pressure: 30psig (200kpa gauge pressure)
- Gas Type: Air, H₂, CO, CO₂, N₂, Gas Mixture
- Response Time: 0.8s for Gas Flows greater than 0.4L/min
- Flow Rate Range: Flow Rate Independent
(Increasing below 0.4L/min), High flow 15L/min or Bypass
- Max Sample Cell Temperature: 105°C
- Analog Output: 0-5VDC, 20mA Maximum

Fuel Cell Test Station

Humidifier System		Detail
		Bubble Type Humidifier or Nafion Membrane(Tube) Type Temperature Controller Float S/W, Sight Glass Flow Capacity - Custom

Component & Material

Cell		Detail
		Cell Hardware for PEMFC 5cm ² , 10cm ² , 25cm ² , 50cm ² , 100cm ² Single or Triple, Custom Flow Pattern Graphite Block, Current Collector, End Plate 220VAC Heater

Membrane		Detail
		Nafion Membranes, FuMa-Tech Membranes, Anion Exchange Membranes

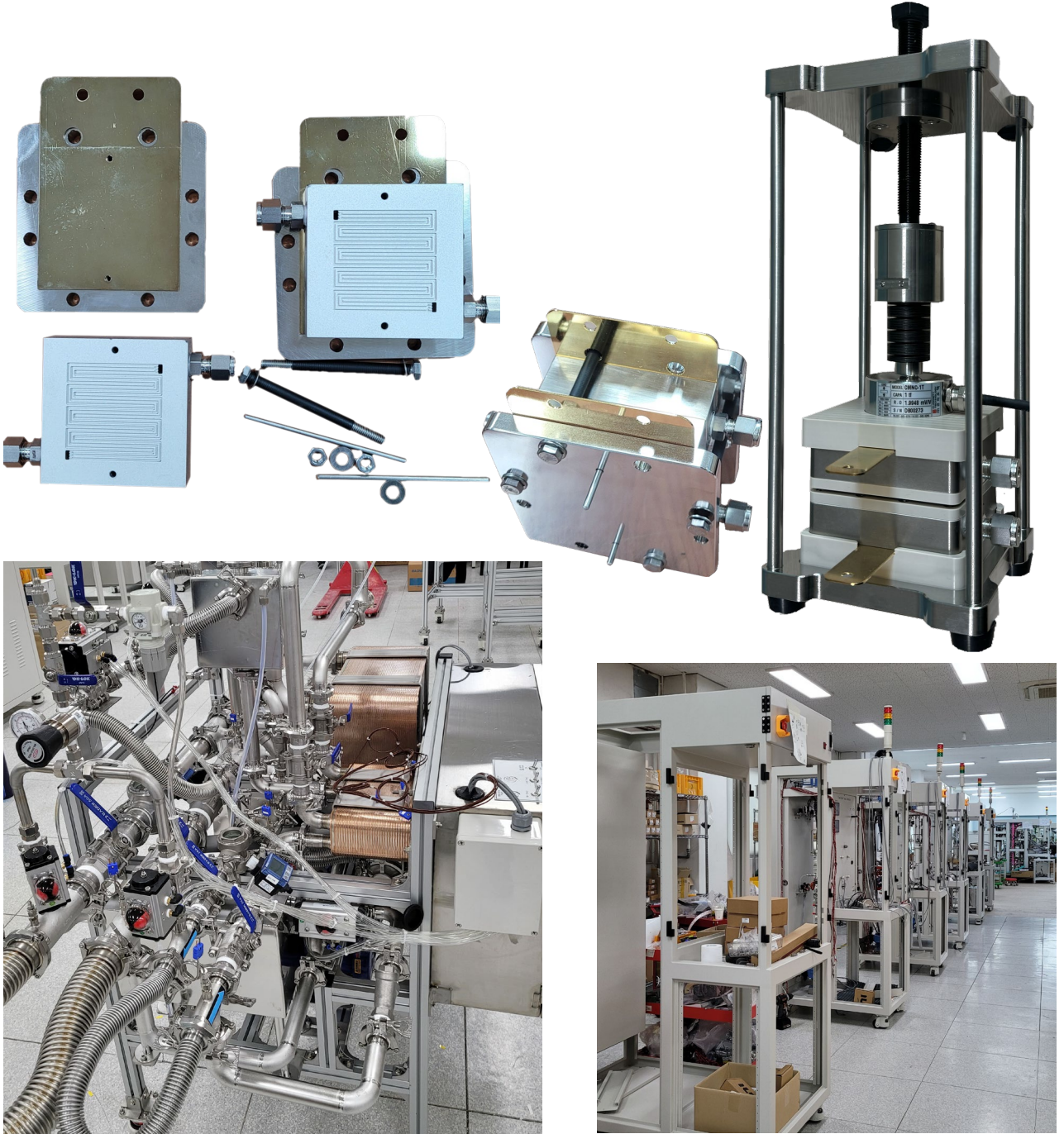
GDL		Detail
		Carbon Cloth Carbon Paper Wet Proofing% Selection

MEA		Detail
		Membrane Electrode Assembly 3Layer, 5Layer 5cm ² , 10cm ² , 25cm ² , 50cm ² , 100cm ² Catalyst Loading, Custom Design

Custom Design For Electrochemical Reaction Test

Cell Hardware and Test Station

- Special Type Fuel Cell Test
- Metal-Air or CO₂ Test
- Special Type CO₂ Conversion Test
- Special Type Electrolyzer Test
- Multi Channel Test Type



Memo

Fuel Cell & Water Electrolyzer Test Station

For the Green Energy World

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