HYDROGENERGY
TECHNOLOGIES

PRODUCT CATALOG

HYDROGENERGY
TECHNOLOGIES

Make: Hydrogenergy
Model: HYDRO_STHERMAL

1. SOLAR THERMAL FPC TRAINER

The Solar Thermal Flat Plate Collector (FPC) Trainer is designed to demonstrate the fundamentals of solar water heating using non-concentrating solar thermal technology. It enables students to analyze thermal performance under varying conditions and understand solar heat transfer principles.

Key Features:

- Real-time temperature and flow measurement
- Adjustable tilt angle for solar optimization
- Integrated data acquisition for analysis

Key Specifications:

S. No.	Components	Sub- Components	Specifications
1	**Flat Plate Collector**	**Collector Box**	
		Length	2030 (mm)
		Breadth	1030 (mm)
		Glazing Surface	
		Type of glass	Toughen
		Absorber plate	
		Absorber material	Copper
		Capacity	100 LPD
2	**Hot Water Tank**	Tank Type - Non-Pressurized	
3	**Control unit**	Temperature meter with sensors	
		Flow meter with sensor	
		Flow regulator	
4	**Artificial source of radiation**	**Halogen Fixture with regulator**	
		Power rating	5400 (W)
		Light Source	Halogen Tubes (36, 150 W each)
		Regulator Rating	Dimmer, 0-240V, 30 Amp. AC
5	**Artificial source of wind speed**	Wind speed range	0 to 5 (m/sec)
6	**Tanks**	Hot Water Tank	100 L (1) Non-pressurized Metal Tank with insulation
		Auxiliary Tank	100 L (2) Non-Pressurized FRP Tanks
7	**Accessories**	**Radiation meter**	
		Range	0 to 1999 $(\frac{W}{m^2})$

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Make: Hydrogenergy
Model: HYDRO_SCONC

2. SOLAR PARABOLIC TROUGH TRAINER

This trainer illustrates the working of a concentrating solar thermal system using a parabolic trough to focus sunlight on a receiver tube. It helps in studying thermal energy conversion, tracking mechanisms, and fluid heating applications.

Key Features:

- Solar tracking mechanism (manual/automatic)
- High-temperature fluid circulation system
- Temperature monitoring at multiple points

Key Specifications:

S. No.	Components	Sub-Components	Specifications
1	Heat generating unit with Tracking system	**Parabolic Trough collector**	
		Reflecting material	SS (acrylic mirror in next version)
		Length	1219.2 (mm)
		Arc length (perimeter)	1828.8 (mm)
		Absorber tube	
		Number	2
		Absorber material	Copper, SS
		Tracking system	
		Mode of tracking	Single axis (dual axis in next version)
2	Storage unit	**Supply tanks** Material	SS
		Number	2
		Storage tank-1	
		Material	SS
		Storage tank-2 (with heat exchanger)	
		Material	SS
		Storage tank Insulation	
3	Control Unit	**Sensors and regulators**	
		Temperature meters with sensors	
		Flow meter with sensor	
		Flow Regulator	
4	Accessories	**Radiation meter**	
		Range	0 to 1999 $(\frac{W}{m^2})$
		Anemometer	

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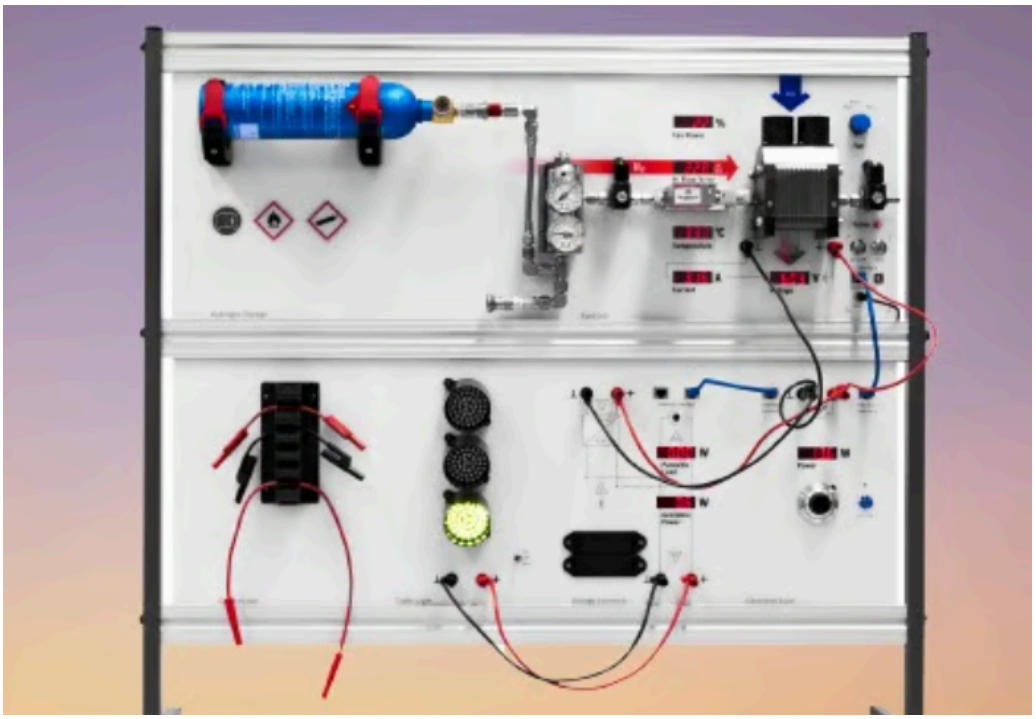
Model: HYDRO_FC

3.FUEL CELL TRAINING SYSTEM



Fuel Cell Training System is a standalone, modular educational platform designed to help students and researchers understand the practical workings of hydrogen fuel cell technology. The system demonstrates how electrical power is generated using dry hydrogen, regulated, stored, and supplied to real-world DC and AC loads—enabling a complete learning experience in sustainable energy systems.

Key Features:

- Fully integrated PEM fuel cell-based training system
- Dry hydrogen input from standard hydrogen cylinder
- Safe, compact, and scalable design suitable for academic laboratories

Key Specifications:

S.no	Attribute	Specifications
1	Fuel Cell	
1.1	Type of fuel cell	PEM
1.2	Number of cells	48
1.3	Rated Power	1000W
1.4	Performance	28.8V @ 35A
1.5	H2 Supply valve voltage	12V
1.6	Purging valve voltage	12V
1.7	Blower voltage	12V
1.8	Reactants	Hydrogen and Air
1.9	External temperature	5 to 30ºC
1.10	Max. stack temperature	65ºC
1.11	H2 Pressure	0.45-0.55bar
1.12	Hydrogen purity	≧99.995% dry H2
1.13	Humidification	self-humidified
1.14	Cooling	Air (integrated cooling fan)
1.15	Stack weight (with fan & casing)	4000 grams(±100grams)
1.16	Controller weight	400 grams(±30grams)
1.17	Dimension	23.3cm x 26.8cm x 12.3cm
1.18	Flow rate at max output*	13 L/min
1.19	Startup time	≦30S at ambient temperature
1.20	Efficiency of stack	40% @ 28.8V
1.21	Low voltage shut down	24V
1.22	Over current shut down	42A
1.23	Over temperature shut down	65°C
1.24	External power supply**	13V(±1V),8A

Key Specifications:

		(99.995% pure) at 150bar pressure
2.	POWER CONDITIONING UNIT	
2.1	Attribute	Specifications
2.2	Charge Controller	1 kW PWM Charge Controller
2.3	Battery Bank	12 V, 26 Ah, 2 Batteries in series
2.4	Inverter	24 V Battery, 1650 VA Home Inverter
2.5	Measurement Devices	AC Voltmeter (0-750 V AC) - 1 Nos. AC Ammeter (0 - 10 A AC) - 1 Nos. DC Voltmeter (0- 50 V DC) - 3 Nos. DC Ammeter (0 - 50 A DC) - 3 Nos. Rotameter (0-15 LPM) Dual stage pressure meter (for measuring pressure inside (0- 200bar) the cylinder and pressure coming outside the cylinder) (0-10 bar) Pressure Gauge with tuning adaptor (0-5 bar)
3.	LOADS	
3.1	AC Load	300 Watts. Lamp Load (3 hundred watt. Lamps)
3.2	DC Load	Variable Rheostat Voltage

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Model: HYDRO_GES

4.GREEN HYDROGEN ELCTROLYZER

Green Hydrogen Electrolyzer System is a comprehensive academic platform designed to introduce students and researchers to the principles and applications of green hydrogen technology. Tailored for engineering colleges, universities, and research institutions, this system supports experimentation in hydrogen generation, purification, storage, and integration with renewable energy systems.

Key Features:

- Operates on standard 220 V, 50 Hz AC supply
- Modular, scalable design tailored for university laboratories and research centers
- Supports future integration with renewable sources and fuel cell systems

Key Specifications:

S.no	Attribute	Specification
1	PRECISION WATER DISTILLATION UNIT	
1.1	Feed water Sources	Municipal Tap or Rainwater (with pre-filtration)
1.2	Output Water Quality	≤ 1 µS/cm at 25°C (suitable for electrolytic applications)
1.3	Purification Methodology	Single-stage vapor compression distillation
1.4	Water Output Rate	Up to 1 liter/hour
1.5	Input Power	AC 200–240 V, 50/60 Hz
1.6	Control Features	Thermal cutoff, overflow prevention, auto shut-off
1.7	Use Case	Feeds deionized water tank for the electrolyzer system
2.	HYDROGEN STORAGE CYLINDER – LAB GRADE	
2.1	Nominal Volume	10 Litres (water capacity)
2.2	Working Pressure	150 kg/cm²
2.3	Cylinder Classification	Type 1 (Seamless steel, refillable, IS:7285 compliant)
2.4	Hydrogen Purity Grade	Industrial (non-electronics) grade H_2
2.5	Intended Use	Buffer storage post-electrolyzer or pre-fuel cell feed
2.6	Safety Features	Pressure relief valve, manual shut-off, rated regulator
3	ALKALINE ELECTROLYZER	
3.1	Hydrogen Output Rate	0–3000 ml/min (adjustable via control interface)
3.2	Output Pressure	Nominal: 0.4 MPa; Overpressure cutoff: 0.5 MPa
3.3	Hydrogen Purity	>99.99% (dry H_2 suitable for PEM fuel cell feed)
3.4	Electrolyte Composition	18% Potassium Hydroxide (KOH) aqueous solution
3.5	Lye Tank Capacity	15 Liters
3.6	Water Input	Conductivity <1 µS/cm

Key Specifications:

	Requirement	
3.7	Electrical Input	220 V AC, 50 Hz
3.8	Power Consumption	≤2200 W
3.9	Weight	<90 kg
3.10	Thermal Management	Passive air-cooled with venting slots
3.11	Water Storage and Supply Subsystem	Tank Capacity -10 Lit. Pump Type – Low Pressure diaphragm pump, chemically compatible Flow Control – Regulated, continuous feed to electrolyzer
3.12	Safety Mechanisms	- Overpressure release valve - Pressure sensor feedback loop - Shutoff interlock
3.12	Training Demonstration	- Electrolysis efficiency - Gas evolution & purity monitoring - Pressure response & safety behavior
4	ACCESSORY MODULES FOR TRAINING & MONITORING	
4.1	Hydrogen Leak Detector	catalytic type; LED & buzzer alarm
4.2	Water Conductivity Meter	Inline or handheld, range: 0–50 µS/cm
4.3	User Manual	Includes experimental setup, safety SOPs, and maintenance
5	GAS DISTRIBUTION MANIFOLD SYSTEM	
5.1	Monitoring Instrumentation	Dual Analog Pressure Gauges (0–10 bar range)
5.2	Flow Path	Integrated pathway between electrolyzer, storage
5.3	Materials	SS316 for hydrogen compatibility

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Model: HYDRO_ETC

5.ETC CHARACTERIZATION SYSTEM

The ETC (Evacuated Tube Collector) system is a solar thermal device designed to capture solar energy efficiently for water heating and low-temperature thermal applications. It uses glass tubes with vacuum insulation to minimize heat loss, ensuring high performance even in cold and cloudy conditions. The system is ideal for residential, commercial, and industrial solar water heating needs. ETC systems are known for their durability, efficiency, and ease of installation. They contribute significantly to energy savings and reduced carbon emissions.

Key Features:

1. Vacuum-Insulated Glass Tubes – Reduces convective and conductive heat losses for enhanced thermal efficiency.
2. Efficient Heat Transfer – Uses heat pipes or direct flow designs to quickly transfer heat to the water tank.

- All-Weather Performance – Maintains high efficiency in low ambient temperatures and diffused sunlight.

Key Specifications:

Item No.1: ETC Characterization System Qty:1 No.			
S. No.	**Components**	**Sub-Components**	**Specifications**
1	Heat generating unit	Artificial Sunlight Source	
		Type	Halogen
		Qty.	30
		Total power	4500 W
2	Solar ETC	Evacuated Tube collector system	
		Total No. of tubes	10
		Total Capacity	100 LPD
		Material	Borosilicate
		Tube Length	1800 mm
		Tube outer diameter	58 mm
		Coating	German Technology Triple coating copper followed by special N/Al Magnetron sputtering technique (Aluminum nitride coating)
		Absorptance	>90 %
3	Manifold	Single sided 100 LPD manifold for 10 tubes	
		Insulation	50mm PUF insulation
4	External Tank	External Tank with 3000-Watt water heater	
		Material	S.S. 316 grade 2B finish non magnetic
		Insulation	55mm PUF cladding by S.S. mirror
		Capacity	50 ltr.

5	**Heat exchanger Tank**	Capacity	50 ltr.
		Heat Exchanger Material	Copper
		Insulation	External Glass wool jackets
6.	**Measurement Unit**	Temperature meters Pressure Meters Flow meters	
7.	**Chiller Tank**	0.25 TR	
8.	**Accessories**	Radiation meter IR temperature gun	
9	**Characteristics**	• Artificial source of irradiation. • Control of irradiation level as per requirement • Artificial Source of Wind speed with provision to set wind speed as per requirement • Inbuilt facility analogous to rooftop and hot water tank compatible to perform experiment both outdoor and indoor environment. • Water heater available with storge tank for pre heating of water • Chiller tank available to quickly cool hot water• Evaluate system efficiency and heat transfer • An active measurement panel to measure inlet temperature, pressure etc. • Inbuilt facility analogous to rooftop and hot water tank compatible to perform experiment both outdoor and indoor environment. • Artificial Source of Wind speed with provision to set wind speed as per requirement • Flow rate of fluid can be changed • Sturdy structure with lockable wheels	