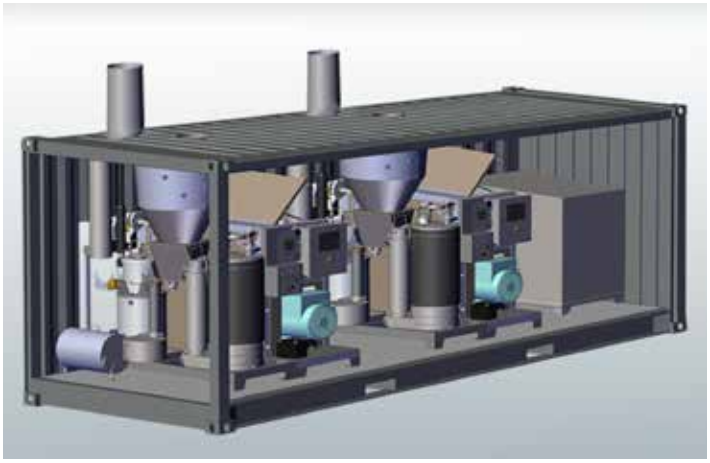
ALL POWER LABS

Carbon Negative Power & Products

130KW POWER PALLET HYBRID CONTAINER

RENEWABLE ON-DEMAND POWER



CONTAINERIZED DUAL PP30 GENSET

The new **130 kW Power Pallet Hybrid Container** genset is an expedited answer to the urgent need for portable high-density power. By combining two of our highly optimized and refined PP30 Power Pallets within a single, standard 20-foot shipping container envelope, we are able to provide a commercially applicable genset, ready to be dropped off a truck anywhere in the world and begin to provide renewable, distributed, low-carbon energy.

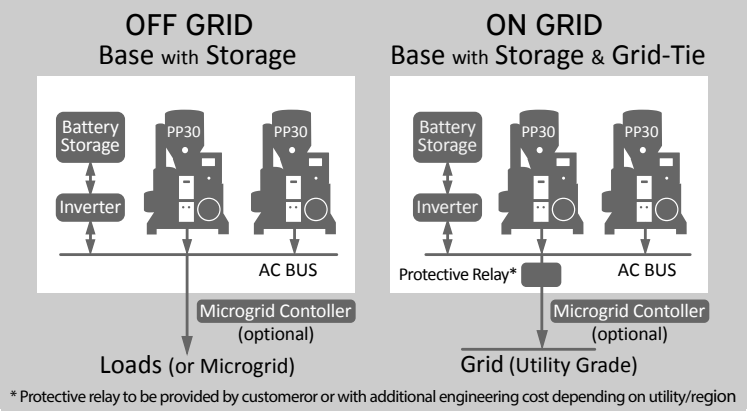
Using a variety of configurations for both on, off-grid, and microgrid use, this 130 kW Power Pallet Hybrid Container features 129 kWh of lithium ion battery storage with an inverter to provide an intermittent load capacity of 130 kW when the PP30 and inverter outputs are combined. This is the most versatile generator APL has ever offered.

Our unique patented multi-stage gasification architecture, in combination with our innovative gasifier-engine thermal integration, electronic control system and waste-heat recycling, gives the Power Pallet base units unprecedented biomass fuel flexibility and efficiency. Combined with our unique integrated power and feedstock handling, this mid sized Powertainer also has unprecedented power-demand flexibility.

The Power Pallet uses agricultural and forestry waste materials that can be readily sourced very near the point of generation. It is compact and portable, easily transported to where the fuel is and where the power is needed. Unlike diesel fuel or gasoline, this fuel is often available at little or no cost, and most importantly, depending on feedstock selection and use details, the Power Pallet is capable of carbon-negative operation.

PERFORMANCE	
Peak Combined Electric Power: Continuous PP30s Only: Inverter Only:	134 kW@60 Hz/128 kW@50 Hz 54 kW@60 Hz/48 kW@50 Hz 80 kW
Sound Level @ 7 meters:	65 dB(A)
Biomass Consumption:	1.0 kg/kWh (dry basis)
Run Time per Hopper Fill: Approximate @ 250 kg/m^3 Fuel Density	5 kW: 12 hrs 10 kW: 6 hrs 15 kW: 4 hrs
Max. Continuous Operation:	>16 hours
Start Up Time:	10-15 minutes
COMBINED HEAT & POWER (CHP)	
Electrical Efficiency:	~23% (woody biomass, LHV) ~28% (syn-gas)
Electrical+Thermal Efficiency: Gasifier HX+Engine Cooling+Exhaust HX:	>65% (biomass) >80% (syngas) (3 stage)
CHP Heat Output: 3 stage: (without Exhaust HX) 2 stage:	2.0 kWth per 1 kWe 1.5 kWth per 1 KWe
Engine Coolant: Working Fluid: Temperature Range:	Up to 50% PEG 75-95°C (165-205°F)
Customer-side CHP: Loop Temp: Minimum Flow Rate @ 100 kWth: Minimum Heat Delivery: Plumbing Connection:	75-90°C (165-195°F) 4.4 m^3/hr (19 GPM) 0 kWth (native radiator backup) 1.5 inch sanitary fitting
GRID TIE / PARALLELING	
Controller:	Deep Sea DSE8610 MKII
OPERATING CONDITIONS	
Ambient Temperature:	5-40°C/40-100°F
Ambient Relative Humidity:	5-95%
Installed Footprint:	7 x 5 x 3 meters 23 x 16 x 10 feet
Site Requirements: Outdoor:	1.75 m Overhead Clearance Well-ventilated, Level Pad,
GAS FILTRATION	
Dry Filtration System: with HX Temp Control	Cyclone+Bag House Gang with Clean-in-place Shaker System
Gas Cooling Pre-filtration: Prevents Tar and H_2O Condensation	Engine Coolant HX Controls to 80-100°C HX In-situ Cleanable
SHIPPING	
Standard Inter-modal Dimensions: :	20 ft x 8 ft x 8.5 ft. high 6.06 m x 2.44 m x 2.59 high
Weight:	5000 kg 11,000 lbs

All specifications are subject to change without notice



* Protective relay to be provided by customeror or with additional engineering cost depending on utility/region

INVERTER

Typical CEC Efficiency	97%
Maximum AC Power	80kVA @ 480 V_{RMS}

STORAGE BATTERY

Battery Capacity	120 kWh DC
System Round-Trip Efficiency	89% (RTE)

ALL Power Labs

APL is the global leader in small-scale gasification technology. For the past two decades we have been designing and perfecting waste biomass gasifiers. Using these groundbreaking technologies, we are developing broad product line of biomass-fueled power generators that are ready for everyday work, serving real-world, distributed-energy needs. We have placed our compact gasifier gensets in over thirty countries, where they are supporting research at more than fifty universities and providing low carbon energy around the world. They are at work now helping to solve the complex and interconnected problems of waste disposal, energy distribution, and climate change mitigation. We are very proud of the work we are doing at our facility in Berkeley, CA. Please contact us to arrange a visit the next time you are in the Bay Area. We would love to show you around.

WARRANTY

ALL Power Labs products are covered by a 100% money back guarantee. If you buy something & find yourself unimpressed with the value of the product or company, we'll refund all your money (minus shipping costs) within 30 days of delivery. APL directly warrants all parts we manufacture (i.e. gasifiers, electronics, & related components) for two years or 4000 hours, & passes along the OEM warranty for parts we source & configure into our end products (e.g. engines & genheads). See **http://allpowerlabs.com/products/warranty** for full details.

GAS MAKING SYSTEM

Gasifier Type:	APL v5.x Patented Multistage Heat Recycling Downdraft
Materials:	304/310/321 SS / Mild Steel
Hearth:	Coated Ceramic
Char-Ash Removal:	Automated Auger to 16 hour batch vessel
Fuel Feed:	Automated: Hopper to Reactor
Hopper Capacity:	333 liters (88 gallons)
Hopper Filling: Batch: Automatic:	Manual while operating Continuous Feed Gate (optional)
Control System:	On-Board Automation
Flare: Clean Swirl Combustor	Auto Ignitor / Manual Mixture

ENGINE

Type:	Ashok Leyland: Hino-Toyota Design
Displacement:	4.0 liter
Cylinder Configuration:	Inline 4 cylinder
Compression Ratio:	12:1
RPM:	1500 @50 Hz, 1800@60 Hz
Valve Configuration:	Overhead, Pushrod
Engine Block:	Cast Iron: Industrial Diesel Based Cylinders Lined for In-frame Rebuild
Pistons:	Aluminum Alloy: Center Dished Ring-trench Inserts Prevent Sticking
Cylinder Head: Circumferal Squish Combustion	Cast Iron Crossflow w/ Hardened Exhaust Inserts
Ignition:	Electronic: ECU Controlled
Lube Oil Capacity:	8 liters (8.5 quarts)
Coolant Capacity:	15 liters (16 quarts)
Auto Shutdown:	Low Oil Pressure High Coolant Temperature
System voltage:	12 VDC
Charging System: AC Genhead	Switch-mode Charger
System Voltage:	12 VDC
Recommended Battery:	Grp 24 Marine: 75Ah, 880 CCA
Auxilliary Components: ECU Controlled 12 VDC	Cooling Fans Water Pump
Auxillary Parasitic Load	850 Watt, 300 Watt w/o Radiator
Speed Control: Elect. Gov.	Woodward L-Series
Automated Mixture Control	Bosch Wide-Band O^2 Sensor

GENERATOR

Type:	Marathon 284CSL1542, 12 wire
AVR:	DSE A106 MK II
Available Voltages:	480 VAC
Total Harmonic Distortion:	<5%
Efficiency:	92%
Motor Surge Starting Cap:	>300%
Maximum Step-load	50% of Rated Power

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