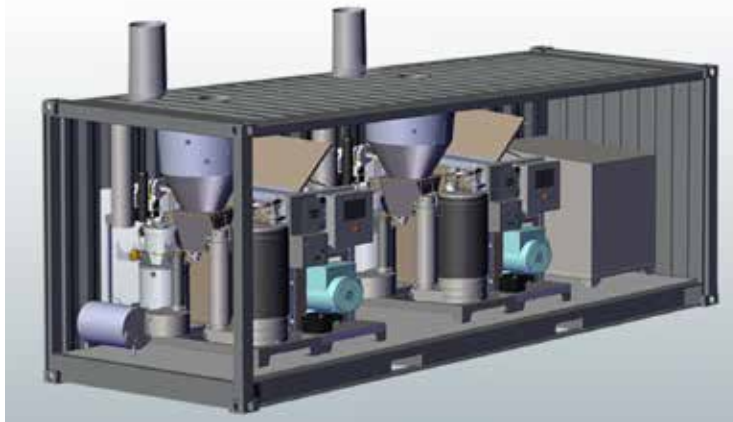




### 50KW PP BASE CONTAINER

#### RENEWABLE ON-DEMAND POWER



#### CONTAINERIZED DUAL PP30 GENSET

The new **50kW PP Base 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 more 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 or off grid use, also available with and optional storage systems, this 50 kW Power Pallet Container 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.

#### FUEL COST COMPARISON (VARIES by REGION)

Diesel/LPG	\$0.25 - \$0.75/kWh
Gasoline	\$0.25 - \$0.75/kWh
Gasified Biomass	<b>\$0.00 - \$0.06/kWh</b>

#### PERFORMANCE

Electrical Power: Continuous:	50 kW@60 Hz / 44 kW@50 Hz
On-grid with CHP:	54 kW@60 Hz / 48 kW@50 Hz
Sound Level @ 7 meters:	65 dB(A)
Biomass Consumption:	1.0 kg/kWh (dry basis)
Run Time per Hopper Fill: Approximate @ 250 kg/m <sup>3</sup> 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 kW <sub>e</sub> 1.5 kWth per 1 kW <sub>e</sub>
Engine Coolant: Working Fluid: Temperature Range:	Up to 50% PEG 75-95°C (165-205°F)
Customer-side CHP: Loop Temp. Minimum Flow Rate @ 50 kWth: Minimum Heat Delivery: Plumbing Connection:	75-90°C (165-195°F) 2.2 m <sup>3</sup> /hr (9.5 GPM) 0 kWth (native radiator backup) 1.5 inch sanitary fitting

#### GRID TIE / PARALLELING

Controller:	Deep Sea DSE8610 MKII
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#### 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, Covered from Rain and Direct Sun
Enclosed or Poorly Ventilated:	Forced Convection Hood Over Flare

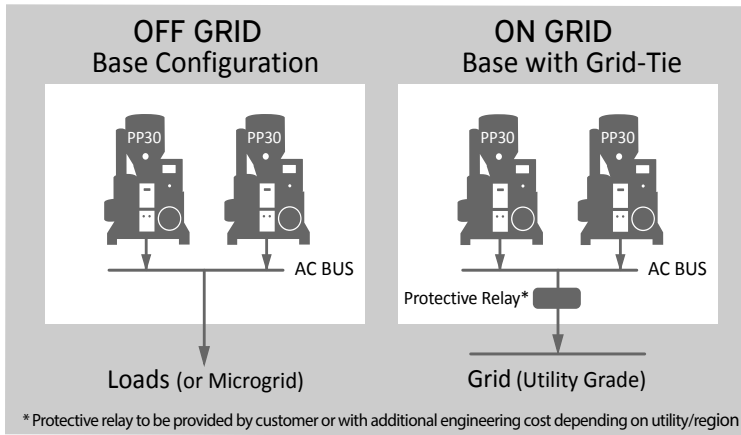
#### SHIPPING

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

#### GAS FILTRATION

Dry Filtration System:	Cyclone+Bag House Gang Clean-in-place Shaker System Prevents Tar and H <sub>2</sub> O Condensation
HX Temp Control:	
Gas Cooling Pre-filtration:	Engine Coolant HX Controls to 80-100°C HX In-situ Cleanable

All specifications are subject to change without notice



## ALL Power Labs

APL is the global leader in small-scale gasification technology. We make biomass-fueled power generators that are ready for everyday work, to serve real-world, distributed-energy needs. Our compact gasifiers are now at work in over thirty countries, and support research at more than fifty universities around the world.

Our APL team is an unusual combination of hands-on fabricators and university-trained scientists and engineers. The result is a powerful combination of technical ability and physical know-how for developing innovative energy solutions.

We are deeply committed to supporting and developing biomass energy conversion by curating and disseminating comprehensive information and data on gasification science and technology—online, in workshops, and free open house events.

Our facility is 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: Manual while operating Automatic: 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:	Cast Iron Crossflow Circumferal Squish Combustion 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:	Cooling Fans ECU Controlled 12 VDC 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 <sup>2</sup> Sensor

## GENERATOR

Type:	Marathon 284CSL1542, 12 wire
AVR:	DSE A106 MK II
Available Voltages:	120-277, 240-480 VAC
Available 3Φ Topologies:	Series or Parallel, Delta or Star
Total Harmonic Distortion:	<5%
Efficiency:	92%
Motor Surge Starting Cap:	>300%
Maximum Step-load	50% of Rated Power

All specifications are subject to change without notice