GeoPura®

Sustainable
Power
Now

HPU1 - M

Hydrogen Powered Generator



ZERO EMISSION FUEL

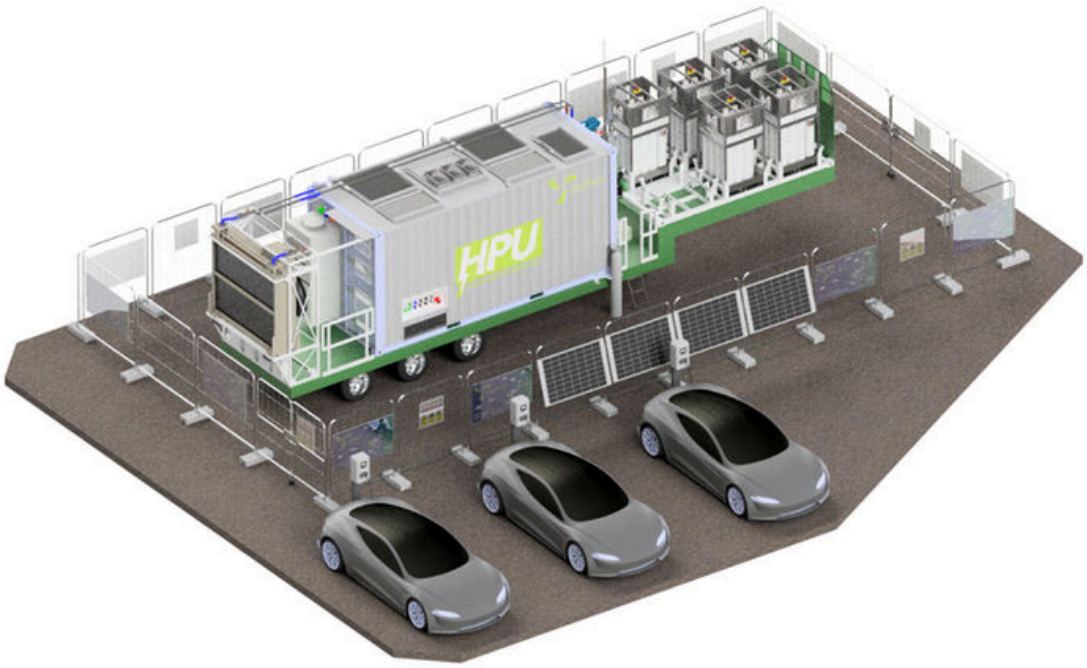
GREEN POWER GENERATION

GEOPURA HPU1-M TECHNICAL SPECIFICATION

GeoPura uses fuel cell technology to provide zero emission electricity when and where it's needed - the only by-product is pure water and heat. The use of green hydrogen in our Hydrogen Power Units (HPUs) does not harm the environment unlike the use of diesel and even bio replacements like HVO, which still produce harmful emissions such as CO2, SOx. NOx and PM that have a devastating impact on natural habitats and health.

Fuelled by green hydrogen to ensure zero emissions, the GeoPura HPU1 is leading the way in hydrogen power capabilities and has provided energy for festivals, displaced diesel generators in construction, delivered critically backed power to film/TV, live sports and EV charging.

The HPU1-M (mobile) is an HPU1 delivered on a GeoPura custom designed trailer, facilitating rapid deployment. The ease and efficiency of delivery, together with reduced cost and time for installation makes it a fantastic solution for short-term zero emission power requirements. The HPU1-M can carry up to five fully integrated 300Barg GeoPura hydrogen MCPs, containing 85kg of hydrogen, equivalent to 2.8MWh of energy.



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HPU1-M SPECIFICATION

- 250kW power output (400V 3 phase AC, 50 / 60Hz, 4 wire)
- Prime power from industrial Proton Exchange Membrane Fuel Cell (PEMFC)
- 100% zero emission – the exhaust is pure water and heat
- 250kWh of fully integrated battery storage
- Off-grid (island), grid augmentation / synchronisation (mains current limitation) and back-up power modes
- Full G99 compliance when operating in mains grid synchronisation mode
- Multiple HPU1-Ms can be combined to provide a fully resilient 2MW system
- Fully redundant, uninterruptible power system rated for full load
- Quiet operation, significantly below the noise levels of an equivalently sized diesel genset
- Full CE / UKCA accreditation
- Safety control systems fully compliant with BS EN ISO 13849
- Safe & secure remote monitoring, control, and diagnostic features
- Site set-up / layout compliant with DSEAR (2002), BCGA GN13 and BS EN 60079-10-1
- Manufactured to GeoPura design by Siemens Energy in Newcastle upon Tyne, UK
- 13.6m ADR compliant step frame trailer with ISO 1611 conforming fixing arrangements
- Step frame swan neck carries x5 off hydrogen MCPs (85kg H2) or 8ft tooling container
- ISO 1611 fixing arrangement allows quick and easy swap of hydrogen MCP rack for 8ft tooling container
- HPU1 and trailer C5(M) paint specification
- Designed for deployment in UK and Europe without special dispensation / measures

HPU1-M OPTIONAL EXTRAS

- Combined heat and power: 50kW of hot water (60°C) at peak electrical power output
- EV fast charging: HPU can be supplied with charging posts to create temporary or permanent grid-independent EV charging facilities
- Fully integrated solar PV
- EU-type approved trailer
- 8ft tooling container

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TECHNICAL OVERVIEW

Item	Value
Length of HPU1-M (m)	13.6
Width of HPU1-M (m)	2.6
Height of HPU1-M (m) lower deck / upper deck / MCP and HPU	0.9 / 1.6 / 4
HPU1-M weight without MCPs (kg)	25,500
x5 off MCP weight (kg)	8,665
Tractor unit weight (kg)	9,000
Combined HPU1-M weight (tractor, HPU1 MCPs) (kg)	43,165
Power output (kW)	250
Power output line voltage (V)	400
HPU max. continuous output current per phase (A) see 'HPU1-M Electrical supply characteristics' table for more details	360
Power output frequency (Hz)	50/60
Power output lines	L1, L2, L3, N, PE
Power input line voltage (V)	400
Power input current per phase (A) other configurations available	125
Power input frequency (Hz)	50/60
Power input lines	L1, L2, L3, N, PE
Max. hydrogen inlet pressure (Barg)	300

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TECHNICAL OVERVIEW

Item	Value
Max. nitrogen inlet pressure (Barg)	6
Max. coolant pressure (Barg)	3
Max. noise level internal (dB)	<90dB
Max. noise level external > 1m (dB)	<65dB
Hydrogen supply quality	ISO 14687:2019, grade D
Max. hydrogen usage (g/s)	2.3
Max. water production (L/hr)	75

	External conditions (Operation)	Internal conditions (Operation)	External conditions (Storage/Transport)
Temperature max. (°C)	40	40	60
Temperature min. (°C)	-10	5	-10
Relative humidity max, (%)	100	<95%	100
Altitude (m)	1000	1000	1000

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HPU1-M ELECTRICAL SUPPLY CHARACTERISTICS

Item	Value
HPU power output (kW)	250
HPU output/input voltage (V) Phase/Line	230/400
HPU design Ze (Ohms) for the purposes of circuit design	0.15
HPU max. PFC / PSC (kA) 10msec for one 50Hz half cycle	4.33
HPU max. output current per phase for 30s (A)	630
HPU max. output current per phase for 5min (A)	541
HPU max. output current per phase for 10min (A)	476
HPU max. continuous output current per phase (A)	360
HPU main output isolator / MCCB Powersafe panel mount line drain, with 240mm² H07-RNF singles	NSX630N, 50 kA MicroLogic 2.3 3 Pole 3D (IEC 60947-2) 360A Setting Io = 400, Ir = 0.9, Lsd = 3, Max Zs = 0.18Ω, Short time pick up = 1050A
HPU sub-outlet 125A 3PH+N+E Commando socket with 35mm² H07-RNF singles	SCHNEIDER MCB C120H TP TYPE C 125A 15KA (IEC 60898-1 / IEC 60947-2) Max Zs = 0.23Ω
Main earthing conductor	120mm² H07-RNF single
Earthing system	TN-S system. Earth and Neutral are connected at the HPU Input TX The protective conductor (PE) is a separate conductor. All exposed-conductive-parts of the installation are connected to this protective conductor via the main earthing terminal

The power distribution GeoPura provides with the HPU1 offers the following earth leakage protection:

- Outlets of 32A and below (1ph & 3ph) have RCBO protection at 30mA
- Outlets of 63A (1ph & 3ph) and above have adjustable earth leakage protection which is switched off as standard

HPU1-M ELECTRICAL CONNECTIONS

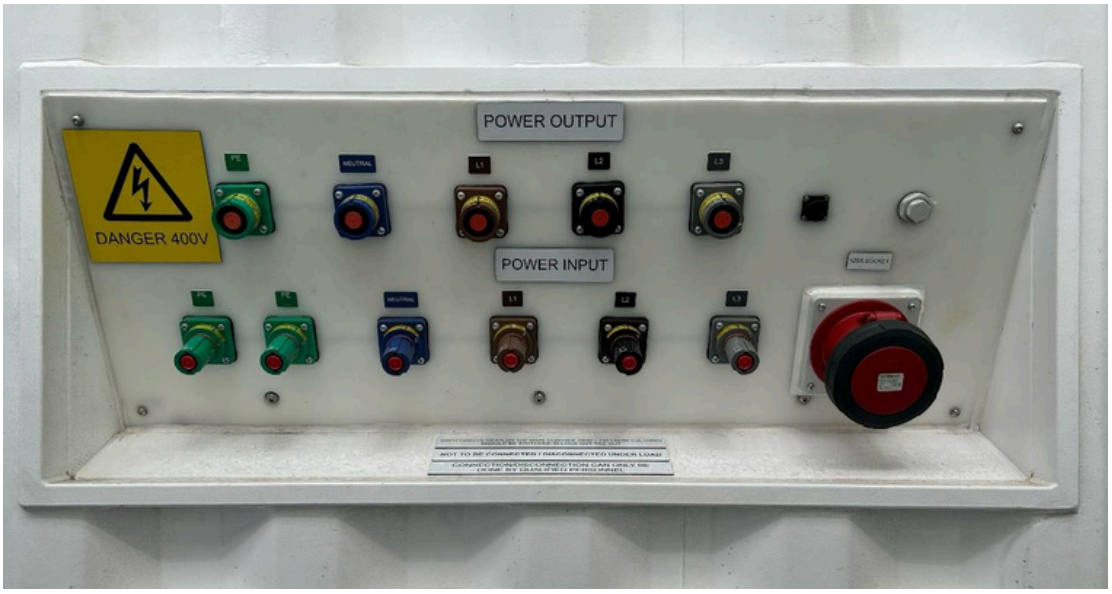
OUTPUT

800A rated panel mount Source Powersafe connectors - L1, L2, L3, N, PE

125A commando socket - L1, L2, L3, N, PE

INPUT

800A rated panel mount Drain Powersafe connectors - L1, L2, L3, N, PE



HPU1-M CHP CONNECTIONS

2" Tri-clamp ferrule flow and return connections

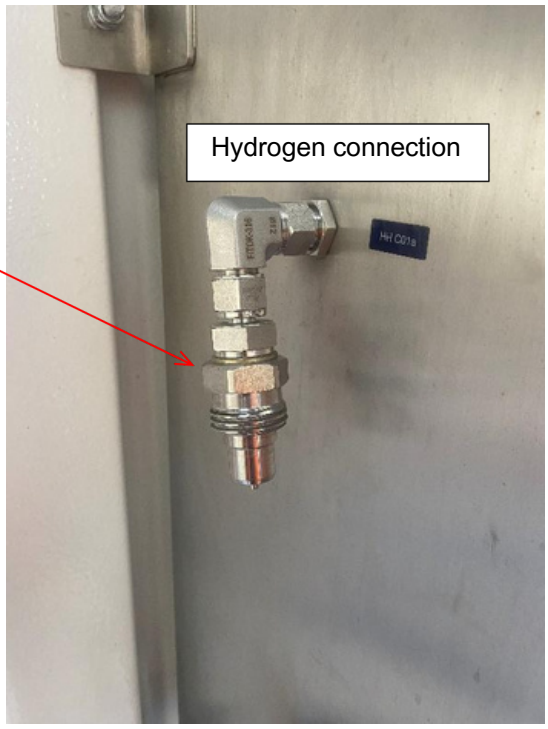


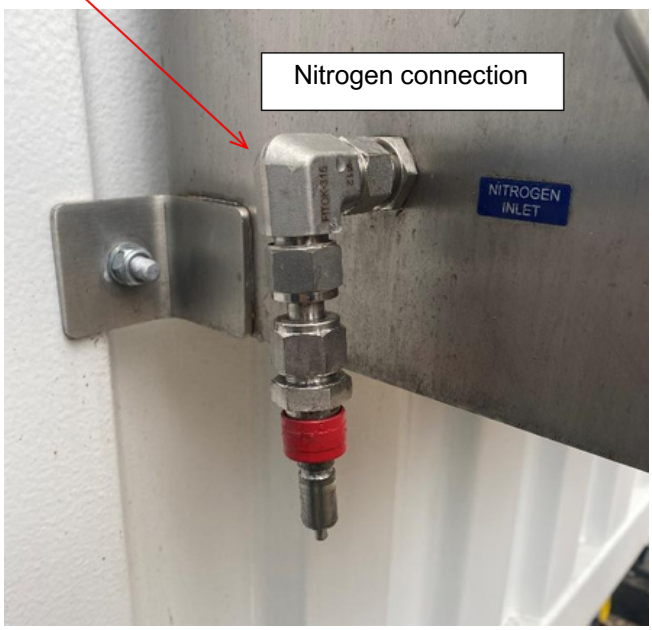
HPU1-M HYDROGEN / NITROGEN CONNECTIONS

Hydrogen: NVFCL096730 Quick Release Coupling , Screw to Connect Male , Size 12, 1/2 BSP Male, Viton Seal , 316 Stainless Steel

Nitrogen: SS-QC8-ML12-D 316SS, QC8 Series, MWP:750psig, O-ring: FKM, Conn.:12mm Tube OD, 2-Ferrule, (DESO) Stem with valve; Shuts off when uncoupled







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HPU1-M TRAILER SPECIFICATION

Overall Length: 13,600mm
Overall Width: 2,550mm
King Pin: 1,600mm
Neck Depth: 203mm
Deck Height: 1,466 & 995mm

Axle Weight: 8,000kg
King Pin Weight: 15,000kg
Chassis Centres: 1,000mm
Fifth Wheel Height: 1,250mm

Item	Specification
Main Chassis frame	• Main chassis beams are fabricated "I" beam construction. • Rolled steel angle side raves. (127x76x8mm.) • Cross members spaced at 457mm centres. Type IPEA80 • Rope hooks fitted every crossmember • No headboard fitted
Axles	• 3 Nr. BPW 9 Tonne Drum Brakes Axles. (300X200mm) • All axles are fixed. (i.e. non lifting)
Suspension	• Triaxle Bpw 9Tonne air suspension (AL2), Heavy Duty R62 single leaf spring • Knorr Bremse (RTR) auto reset raise/lower valve
Kingpin	• Standard 2" bolt in kingpin fitted • Landing Legs • Jost "Modul" maintenance free legs c/w compensating feet • Landing leg handle fitted (UK passenger side)
Side Guards	• Anodised aluminium sideguards fitted
Rear Under Run	• Steel box section. (100x100mm)
Brake system	• 2-line air system in accordance with current regulations. • Knorr Bremse TEBS 2 EBS Braking System (2S2M) c/w load sensing and roll stability. • Controls mounted UK driver's side on chassis forward of bogie.
Front Couplings	• "C" type air couplings mounted in front bulkhead. • 2 x 7 pin electrical sockets. Types ISO 1185 (24N) and 3731 (24S) • Independent ABS/EBS 7638 socket fitted

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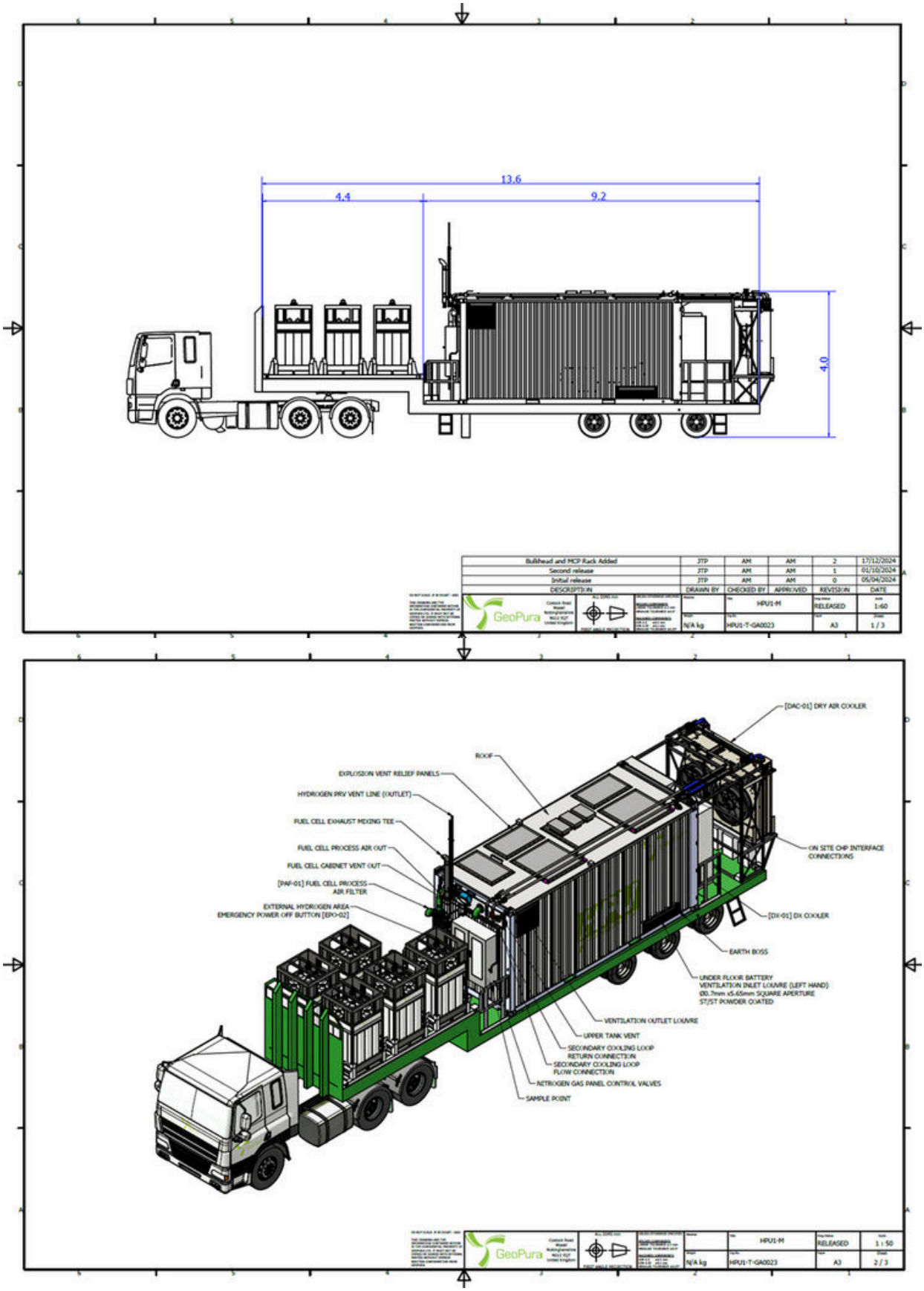
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HPU1-M TRAILER SPECIFICATION

Item	Specification
Electrics and Lights	• Aspoeck Unipoint LED side lights, 5 per side plus LED stalk incorporating rear, side & end outline. marker. • Aspoeck Europoint 3 light cluster bulb, with LED tail c\w triangle • Aspoeck Monopoint LED outline marker lights fitted. • Aspoeck LED rear number plate light mounted on Aspoeck plastic number plate holder. • Rear lights fitted to steel light pressings.
Wheels and Tyres	• 12 x Premium 235/75 R 17.5 twin tyres c/w rims • Wheels are steel, 10 stud. (Presented in factory finish - silver)
Spray Suppression	• 3 pair bolts on thermoplastic midwings • Anti spray mudflaps fitted to each midwing • c/w Dennison lettering. • Colour of midwings is black.
Reflective Markings	• Conspicuity tape fitted to current legislation. COLOUR: Yellow to side, Red to rear.
Finish	• Colour of chassis: Ral / Bs colour of choice. • Paint specification: C5(M)
Notes	• Including ADR certification

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HPU1-M GENERAL ARRANGEMENT DRAWINGS



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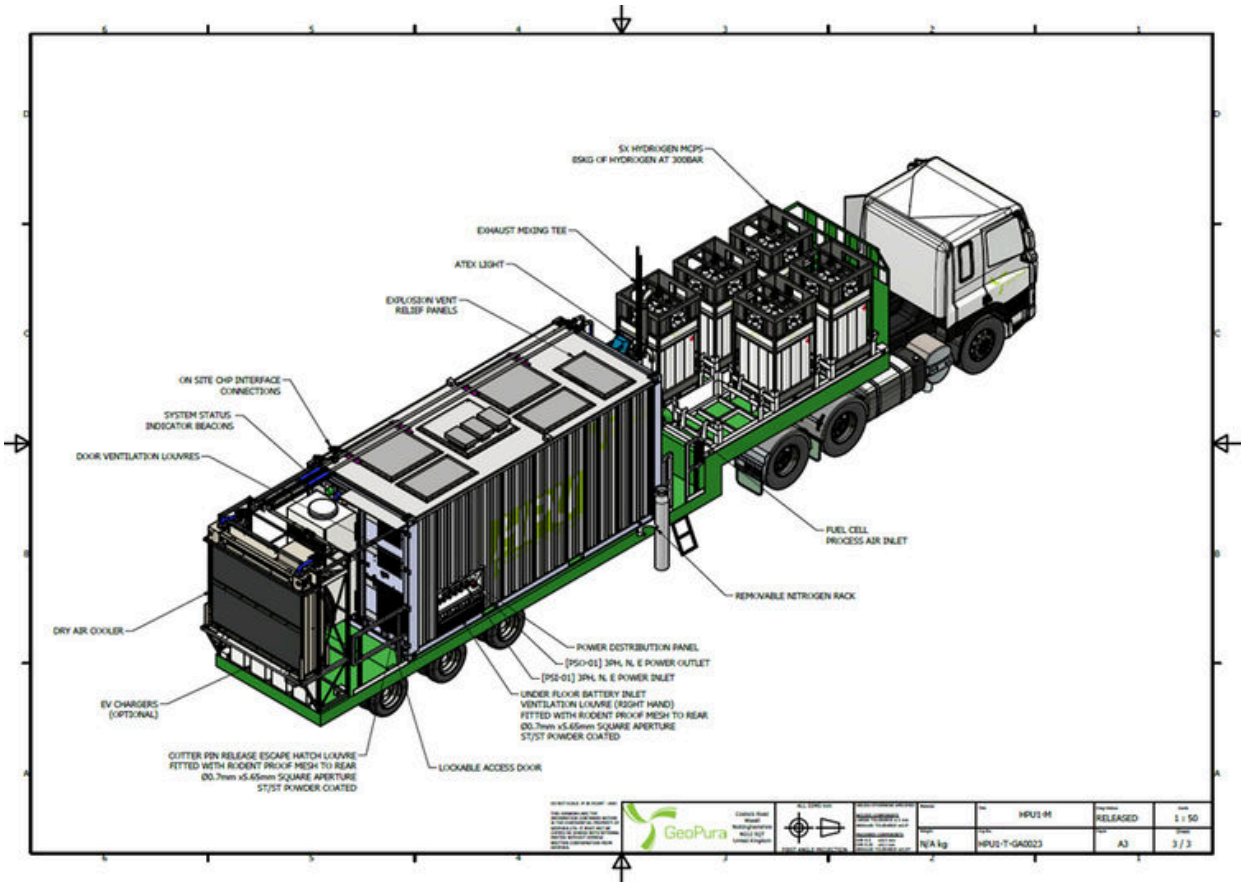
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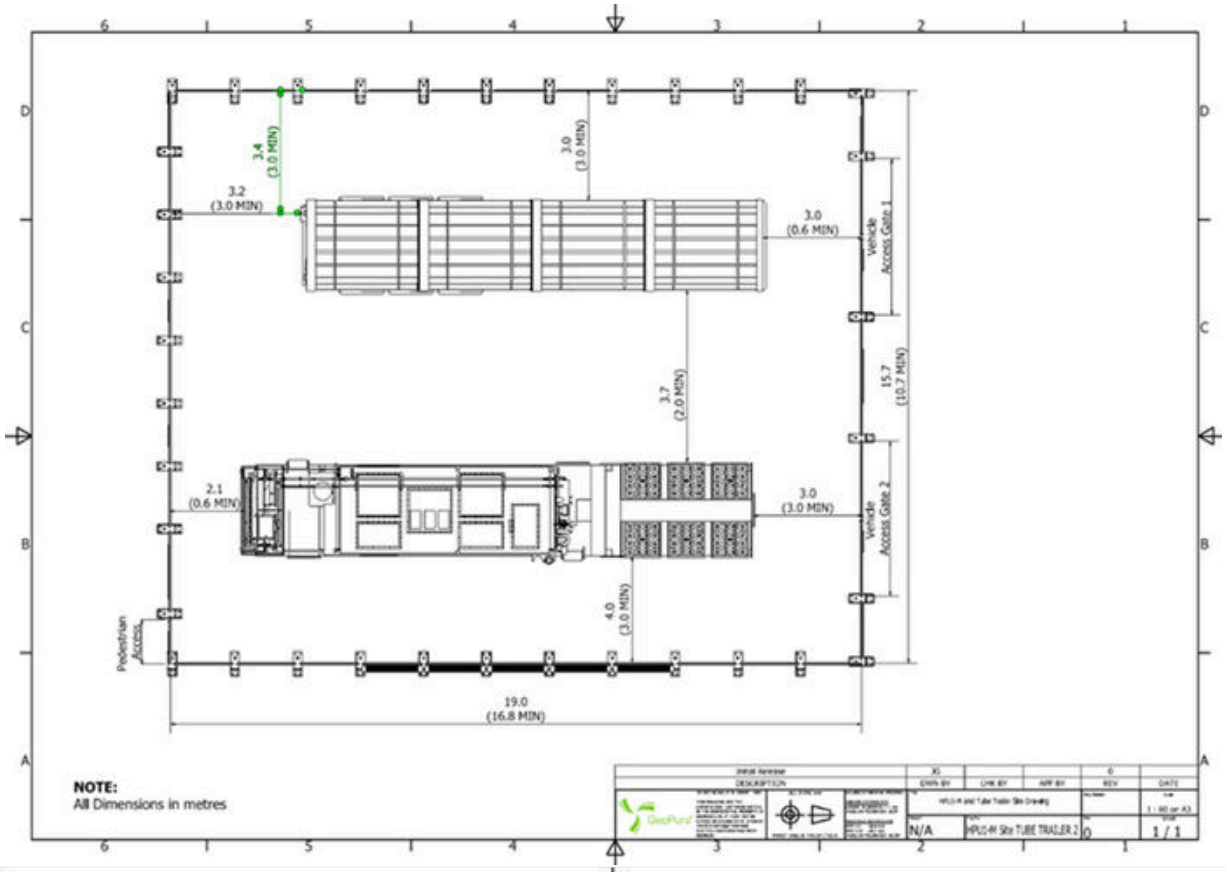
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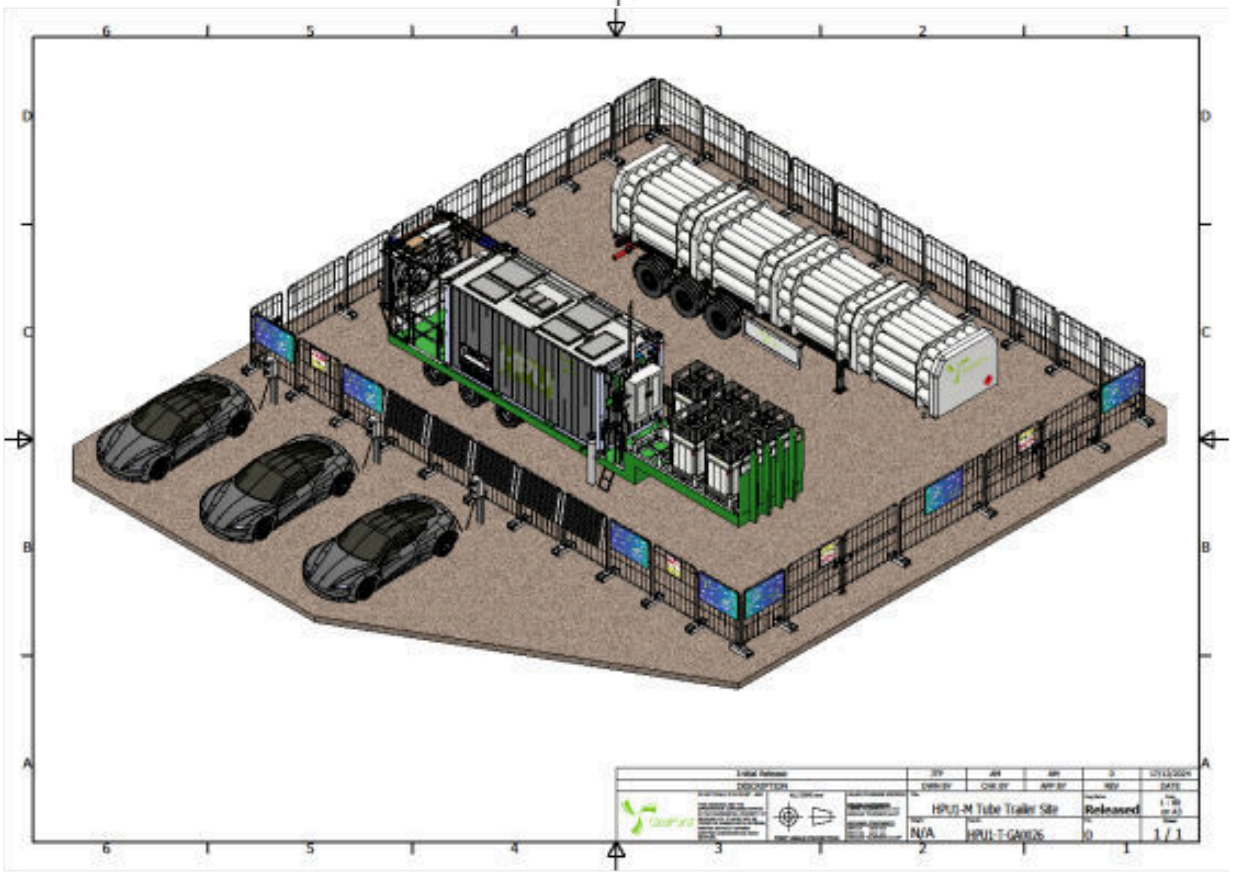
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HPU1-M SITE LAYOUT DRAWINGS

Siting of all HPUs on-site comply with DSEAR (2002), BCGA GN13 and BS EN IEC 60079-10-1:2021





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HPU1-M SITE PHOTOGRAPHS





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HPU1-M SITE PHOTOGRAPHS





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HPU1 CE ACCREDITATION

GeoPura Ltd. declares that:

Equipment: HPU1 three-phase generator

Model: GP-HPU1

Electrical power: 250kW

Complies with the essential requirements of the following EU Directives:

- Pressure Equipment Directive (PED) 2014/68/EU
- Machinery Directive 2006/42/EC
- Low Voltage (LV) Directive 2014/35/EU
- Electro-magnetic Compatibility (EMC) Directive 2014/30/EU
- Equipment For Potentially Explosive Atmospheres (ATEX) Directive 2014/34/EU

And has been designed and manufactured to the following Harmonised Standards:

- *EN IEC 62282-3-100:2020 Fuel cell technologies - Stationary fuel cell power systems. Safety*
- *EN 60204-1:2018 Safety of machinery. Electrical equipment of machines. General requirements*
- *EN ISO 13849-1:2023 Safety of machinery. Safety-related parts of control systems –General principles for design*
- *EN IEC 60079-10-1:2021 Explosive atmospheres - Classification of areas. Explosive gas atmospheres*
- *EN IEC 60079-14:2014 Explosive atmospheres - Electrical installations design, selection and erection*
- *EN 14994:2007 Gas explosion venting protective systems*
- *BS 7671:2018+A2:2022 – SET Requirements for Electrical Installations. IET Wiring Regulations*
- *EN IEC 61000-6-2:2019 Electromagnetic compatibility (EMC) - Generic standards. Immunity standard for industrial environments*
- *EN IEC 61000-6-4:2019 Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments*

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