



# **MOBILE UNIT**

## Datasheet

## Description

The mobile unit is a system with the purpose to inject electrical energy into the low voltage grid on demand. The unit was developed and realised as a prototype for research purposes.

By the use of a powerful frequency converter it is possible to influence the power factor of the injected energy within certain limits.

A diesel generator is used as an energy source for the mobile unit. However it is possible to use other energy sources with the same specification (see on the back).



The mobile unit is controlled over the mobile communication network with the distributed control system of the VEiN (*Distributed Power Supplies in Low Voltage Networks*) project. An operator has to be on-site to start or stop the unit and to be able to take actions in the case of a fault.

## **Functional principle**



The functional principle of the mobile unit can be seen on the **left**. The alternating current, produced from the diesel generator, is rectified with the entry stage of the frequency converter. The inverter at the output of the frequency converter produces alternating current with a controllable power factor. The transformer realizes the galvanic separation between the frequency converter and the low voltage grid. The LCL-filter protects the generator from interferences generated by the frequency converter.

The operating range of the mobile unit is represented **below** in the form of a PQ-diagram.



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## **Specifications**

#### Characteristics

Parameter	Symbol	Value	Unit	Comment
Nominal power	Pn	90	kW	
Nominal voltage	U <sub>n,L-L</sub>	400	Vrms	+/- 10%
Nominal current	l <sub>n</sub>	130	Arms	at nominal voltage
Maximum current	I <sub>max</sub>	140	Arms	at $\cos\varphi=0.9$ and $U_n=360V$ ; during 10
				minutes
Frequency range	f <sub>1</sub>	50	Hz	+/- 0.5Hz
Maximum reactive power	Q <sub>max</sub>	-67.5 – 35	kVAr	
Maximum generator current	I <sub>Genmax</sub>	130	Arms	
Generator type	Synchronous generator with permanent magnet or self-excitation			

#### Recommended operating conditions

Parameter	Symbol	Value	Unit	Comment
Ambient temperature	T <sub>Amb</sub>	0 - 40	°C	
Maximum altitude	h	1000	mamsl	
Ground resistance	$R_{GND}$	<30	Ohm	

#### Other characteristics

Parameter	Symbol	Value	Unit	Comment
Degree of protection of the cabinet	-	IP 54		
Sound level	L <sub>P</sub>	70	dBA	
Ventilation volume	VL	3 x 500	m³/h	

#### Dimensions

Parameter	Symbol	Value	Unit	Comment
Height	h	1.5	m	
Width	w	1.5	m	
Length	1	1.4	m	
Weight	m	800	kg	

#### Met standards

IEC 60364-4-41 IEC 61000-3-15

#### Partners

### VEiN project

http://www.vein-grid.ch info@vein-grid.ch

#### **HES-SO Valais-Wallis**

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For further information or to see measurements or test of the mobile unit the project report may be consulted.