

**SIFU**

## **High Voltage Box SIFU**

For onboard DC rail application

SIFU (Smart Integrated Functional Unit) integrates DC high voltage components in a system that provides a ready-to-use solution for traction power distribution.

Integration of all power distribution related components allows to provide smart integration and functions. Remote ethernet control allow to optimize the train wiring and diagnostic data collection and analysis.

The modular design allows to configure the box dimensions to get an optimized solution.



**MICROELETTRICA**

## BENEFITS

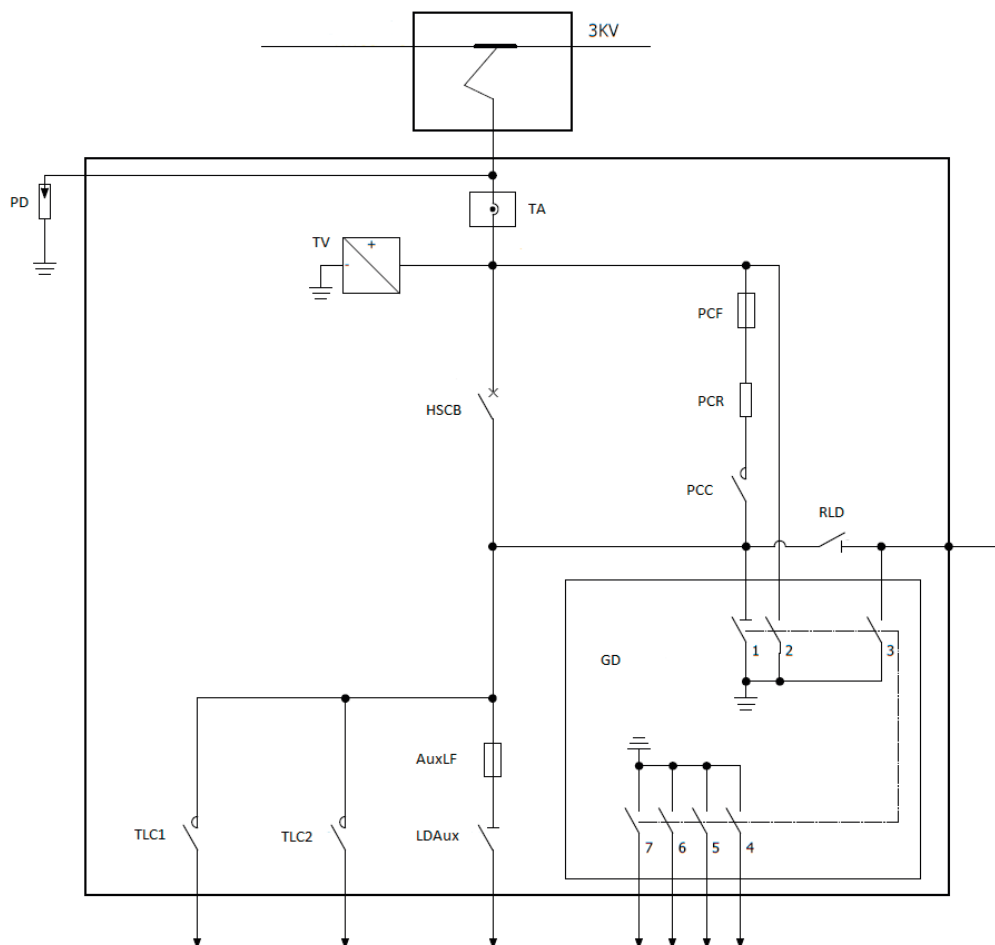
### CAR BUILDER

- Smart Integration (Detailed design and layout concept by Microelettrica)
- Modularity and scalability
- Price, weight, and space reduction
- Quicker and easier final assembly
- Configurability of electrical interfaces
- Engineering effort and risk reduction
- No roof cut-outs necessary




### OPERATOR

- Total ownership and maintenance costs reduction
- CBM implementation (maintenance on demand)
- Selective LRU maintenance
- Remote check and troubleshooting
- Data monitoring
- Machine learning (to extend functionalities)
- Walkable covers
- High environmental conditions protection


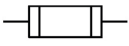


## APPLICATION



## Microelettrica components

Function	Product		Nominal Voltage (Vdc)
Main DC circuit breaker		IR 4000 SERIES VH	1500 / 3000
Isolating Earthing Switch		<b>IES configurable new series</b> <ul style="list-style-type: none"> <li>■ Changeover module (up to 12 poles)</li> <li>■ Earthing module (up to 18 poles)</li> <li>■ Discharge/earthing module (up to 12 poles)</li> <li>■ Electrical &amp; Mechanical interlock</li> <li>■ Integrated or remoted control lever</li> </ul>	1500 / 3000
Measurement		<b>Ecometer Light / ECOBox</b> <ul style="list-style-type: none"> <li>■ Current &amp; Voltage measurement</li> <li>■ Energy measurement</li> <li>■ Harmonics detection</li> <li>■ Overcurrent detection</li> </ul>	1500 / 3000
Line & pre-charging		<b>Line Contactor</b> LTHS, LTHH, LTC and LTX type  <b>Pre-charge Contactor</b> LTHS, LTHH and LTC	1500
		<b>Line Contactor</b> LTHH and LTX type  <b>Pre-charge Contactor</b> LTHH	3000

## Market components

Function	Component		Nominal Voltage (Vdc)
Surge arrester		Rated voltage 4,7kV	1500 / 3000
Fuses		With microswitch status	1500 / 3000
Fire detection & extinguish		Thermo sensible wire Aerosol unit	1500 / 3000
Differential relay		Up to 4000Adc	1500 / 3000

SIFU integration can be realized with high flexibility combining several components from Microelettrica catalog and from best suppliers available in the market. Integration of additional functions is possible under request.

## Main Characteristics

High Voltage Circuit			
Nominal Operational Voltage	Un	[Vdc]	1500 / 3000
Rated Operational Voltage	Ur	[Vdc]	1800 / 3600
Rated Insulation Voltage	UNm	[Vdc]	2300 / 4800
Overtoltage category			OV3
Rated impulse withstand voltage main circuit to earth (1.2/50 $\mu$ S)	UNi	[kV]	15 / 30
Rated Power Frequency Withstand Voltage (50Hz for 60s)	Ua	[kV]	6,9 / 14 (main circuit to earth)
Conventional free air thermal current (¹)	Ith	[A]	Up to 3200 / 1600
Maximum breaking capacity (peak-steady state)		[kA]	141-100 / 77-55

(¹) At Tamb=+40°C

High Voltage Interface	
Input External Cable Connections	Up to 6
Output External Cable Connections	Up to 14
Type of Cable interface	Single cable glands or bushing or modular cable glands

Low Voltage Auxiliary Circuit			
Nominal Voltage	Un	[Vdc]	24 to 110
Voltage Range			0.7 – 1.25 Un

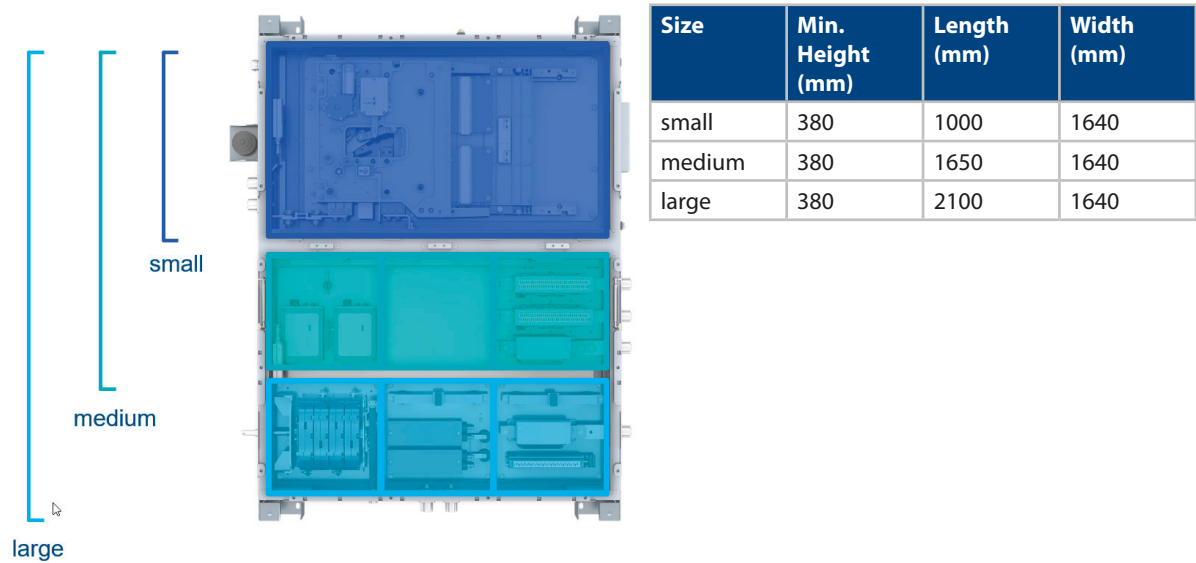
Low Voltage Interface	
Connector type	Harting Han HPR

Operating conditions	
Installation	Outdoor, roof assembly
Protection index	IP56
Altitude above sea level	2000m
Working ambient temperature (outside)	- 25 °C - + 70 °C
Pollution degree (inside)	PD4

Mechanical Characteristics	
Shock and Vibrations (IEC61373)	Cat. 1 - Class A

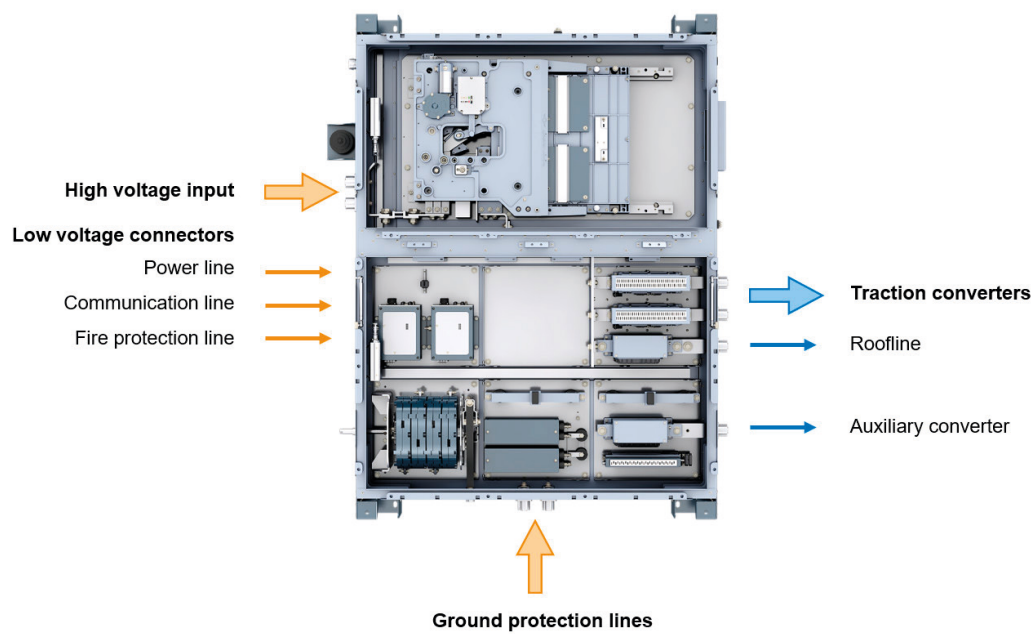
Dimension

SIFU dimensions can be adapted to the specific project content and space requirements. The box can be realized in stainless steel or Aluminium.



Electrical Interface

The type and position of HV and LV interfaces can be modified according to the project requirements.



Safety

- Interlocking system control the earthing switch commutation and the SIFU covers opening. Different configuration of input and output keys are possible using the most common solution available on the market (CISA, KABA, etc.)
- Ventilation is provided by pressure equalization valved and the pressure generated during HSCB opening is managed by an exhaust system.
- Detection and extinguishing fire protection are integrated as an option.

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