MEDCOM

Power Electronic Solutions for Public Transport

PASSENGER COACHES

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PASSENGER COACHES

MEDCOM is a manufacturer of single and multi-system static converters that provide the LV power supply in coach installations, using the energy from the traction network.

The multi-system converters are designed for operation with power supply voltages used in the European traction systems (according to UIC-550), whereas single-system converters are designed to operate with one input voltage.

The devices are presently manufactured with the output power ranging from 6.5 kW to 100 kW. The parameters of outputs (AC and DC) are adjusted to the requirements of the coach load and are characterized by very good operational properties. The AC voltages have, e.g., a very low level of harmonic distortion (THD), which reduces losses in case of motor power supply. At the DC outputs, the converters co-operate with all types of batteries, ensuring proper charging characteristics and voltage thermal compensation. In the case of the supply of air conditioning systems in coaches, the converters may be equipped with variable output frequency inverters.

An auxiliary inverter (powered from the converter or 24 VDC batteries) may be supplied together with other converters. It ensures power supply for 230 VAC loads used inside coaches (e.g. for laptops).

Other devices used in coach air conditioning systems such as air conditioning controller, heating controller and compartment temperature regulator are also in our offer.

All the converters are equipped with a diagnostic-control system based on a MVB, CAN 2.0 B or RS232 interface.

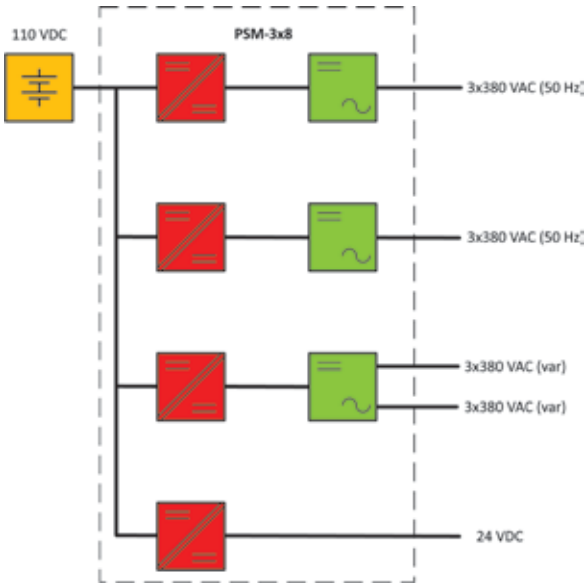
PSM-3×8

Static Converter

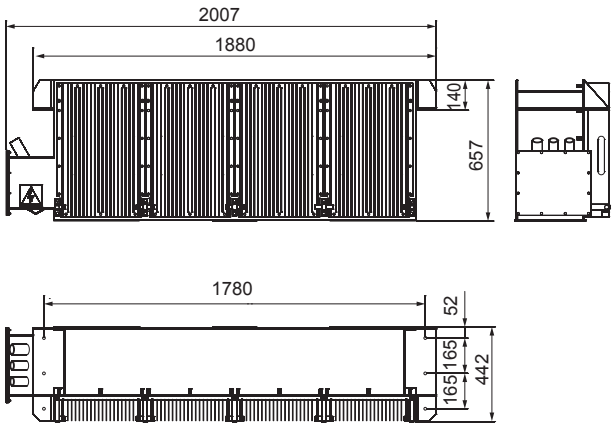
The PSM-3×8 static converter is designed to convert 110 VDC on-board voltage into three, regulated U/f 3×380 VAC outputs and one 24 VDC output required to power the loads installed in a passenger coach (compressors, air conditioning system fans, DC drives for doors).

Specification	
Input voltage	**110 VDC** (operating range 85 V ÷ 150 V)
Outputs K1, K2, B	**24 VDC**
P = 6 kW, regulated voltage 3×380 VAC/50 Hz ÷ 3×190 VAC/25 Hz, Imax = 15 Arms	
Output D	
24 VDC ±10 %, ripple ≤ 5 % In = 12.5 A, Imax = 40 A	
Total output power	**19 kW**
Total efficiency	**> 83%**
Ambient temperature	**–45 ÷ +50°C**
Cooling	**natural**
Protection ratio	**IP56**
Weight	**300 ±30 kg**
Dimensions	**2007×442×657 mm**

Block diagram



Housing



PSM-6k5W

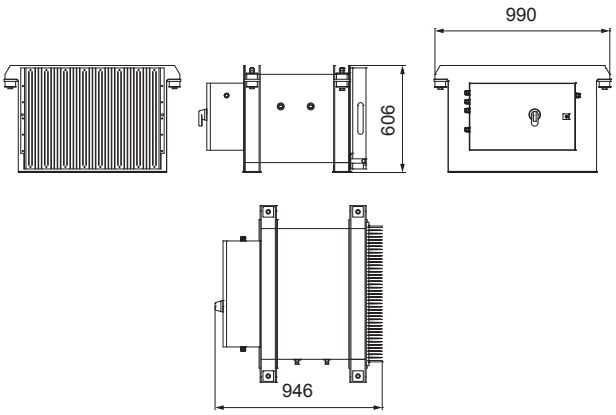
Static Converter

The PSM-6k5W static converter is a multi-system converter designed to convert DC and AC voltages from the railway traction networks, into 24 VDC, used in low voltage installations for coaches.

Specification	
Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** (operating range 800÷1200 V) **1000 V – 50 Hz** (operating range 800÷1200 V) **1500 V – 50 Hz** (operating range 1050÷1740 V**)** **1500 V – DC** (operating range 1000÷1950 V) **3000 V – DC** (operating range 1800÷4000 V)
Output voltage	**24 VDC**
In = 230 A*; Voltage stability ≤ 1%; Voltage ripples ≤ 0.5%; Adjustable battery charging current; Automatic battery voltage compensation with the ambient battery temperature change (from –10 to +50°C) 28.8 V–25.6 V	
Total power	**6.5 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Weight	**180 kg**
Dimensions	**606×990×945 mm**
*) When the nominal current value is exceeded, the output voltage is automatically decreased. If, due to high overload, the voltage drops to ca. 8.5 V, the operation of the converter is blocked. Under overload alarm signal is activated.	

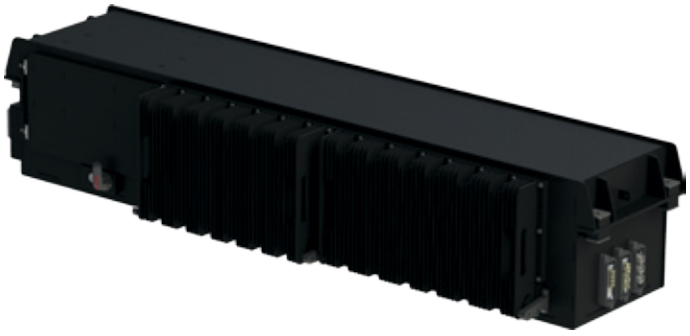
Block diagram

Housing



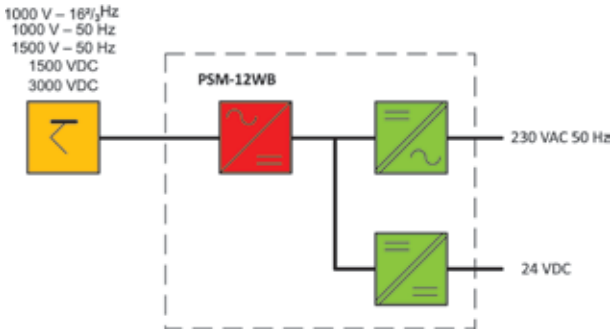
PSM-12WB

Static Converter



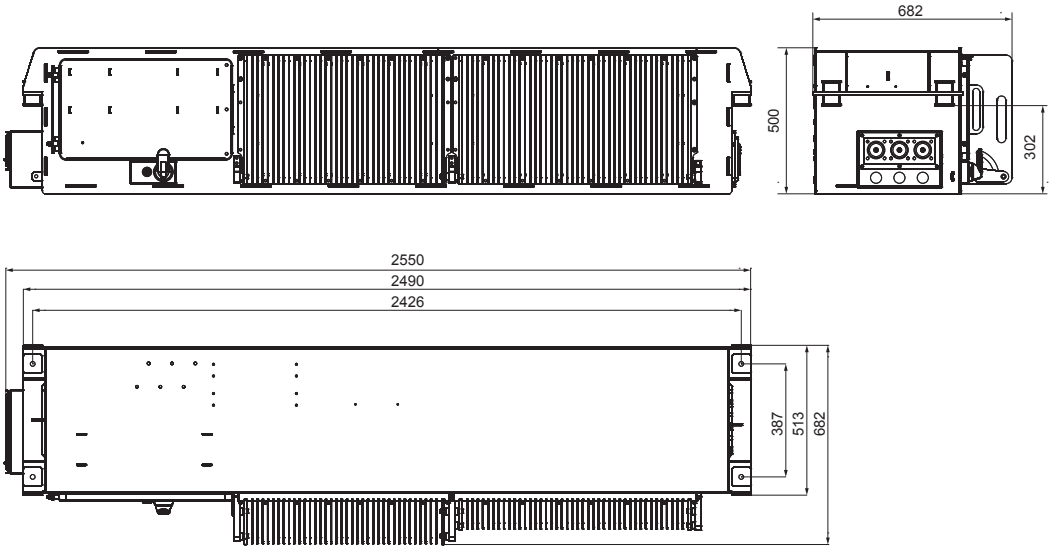
The PSM-12WB static converter is a multi-system converter designed to convert DC and AC voltages used in the European railway traction, into 24 VDC and 230 VAC, required in the low voltage systems of coaches.

Block diagram



Specification	
Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** **1000 V – 50 Hz** **1500 V – 50 Hz** **1500 V – DC** **3000 V – DC**
Output voltage 1	**24 VDC**
P = 8 kW; In = 330 A; Voltage stability ≤ ±1%; Voltage ripples ≤ ±0.5%; Battery charging current 10–100 A (adjustable); Battery charging voltage thermal compensation	
Output voltage 2	**230 V ~ (50 Hz)**
S = 5 kVA; In = 22 A; Overload 200%/5 s; Voltage stability ≤ ±5 %	
Rated power	**12 kW**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Weight	**250 kg**
Dimensions	**1052×1217×606 mm**

Housing

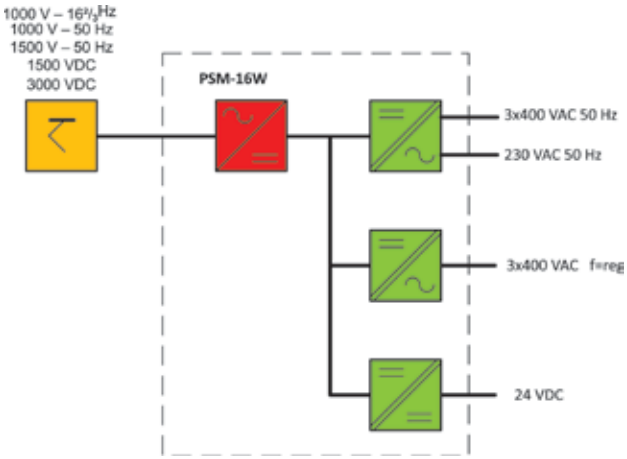


PSM-16W

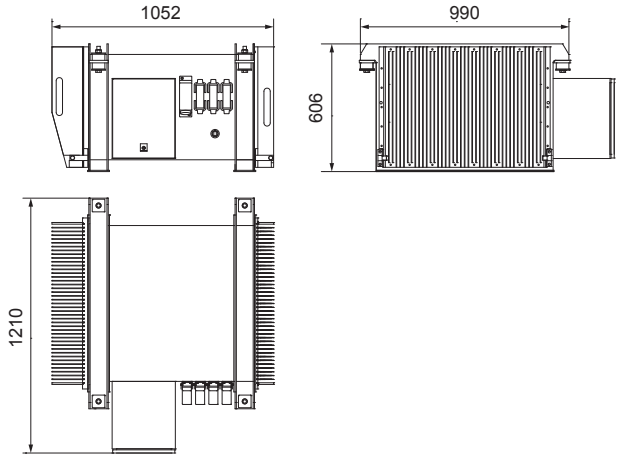
Static Converter

The PSM-16W static converter is a multi-system converter designed to convert DC and AC voltages used in the European railway traction, into 24 VDC and 3×400 VAC, 230 VAC, required to power air conditioning systems in coaches.

Block diagram



Housing



Specification

Input voltage	**1000 V – 16 ⅔ Hz** (operating range 800÷1200 V) **1000 V – 50 Hz** (operating range 800÷1200 V) **1000 V – 50 Hz** (operating range 800÷1200 V) **1500 V – 50 Hz** (operating range 1050÷1740 V) **1500 V – DC** (operating range 1000÷1950 V) **3000 V – DC** (operating range 2000÷4000 V)
Output voltage 1	**24 VDC**
P = 6.5 kW; In = 240 A; Voltage stability ≤ 1%; Voltage ripples ≤ 0.5%; Battery charging current 10–100 A (adjustable); Automatic battery voltage compensation with the ambient battery temperature change (from –10 to +50°C) 28.8 V–25.6 V	
AC1	**3×400 VAC (50 Hz)**
S = 10 kVA; Voltage stability ≤ ±5%; Frequency stability ≤ ±0.2%; THD(u) ≤ 5%; Overload 200%/5 s; Electronic short circuit protection; Possibility of 230 V (2 kW) asymmetric load	
AC2	**3×400 VAC (var)**
S = 2 kVA, U/f = const.	
Total power	**22.5 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Weight	**450 kg ± 10%**
Dimensions	**606×1052×1210 mm**

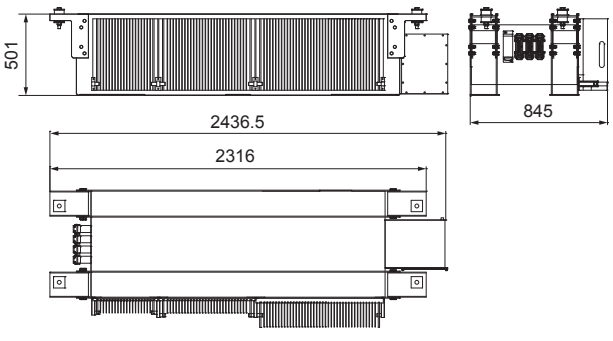
PSM-16W-Arow

Static Converter

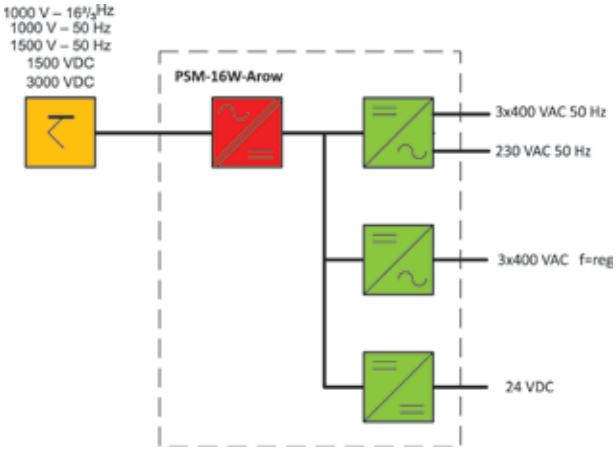
The PSM-16W-Arow static converter is a multi-system converter designed for passengers coaches to convert DC and AC voltages used in the European railway traction, into 24 VAC and 3×400 VAC, 230 VAC, required to power the loads installed in passenger coach.

Specification	
Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** (operating range 800÷1200 V) **1000 V – 50 Hz** (operating range 800÷1200 V) **1500 V – 50 Hz** (operating range 1050÷1740 V) **1500 V – DC** (operating range 1000÷1950 V) **3000 V – DC** (operating range 2000÷4000 V)
Output voltage 1	**24 VDC**
P = 5.5 kW; In = 240 A; Voltage stability ≤ 1%; Voltage ripples ≤ 0.5%; Battery charging current 10–100 A (adjustable); Automatic battery voltage compensation with the ambient battery temperature change (from –10 to +50°C) 28.8–25.6 V	
Output voltage AC1	**3×400 VAC (50 Hz)**
S = 15 kVA; Voltage stability ≤ ±5%; Frequency stability ≤ ±0.2%; THD(u) ≤ 5%; Overload 200%/5 s; Electronic short circuit protection; Possibility of asymmetric load 400 V/230 V (4 kVA) or 230 V (2 kVA)	
Output voltage AC2	**3×400 VAC (var)**
S = 2 kVA, U/f = const.	
Total power	**22.5 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Weight	**650 kg ± 10%**
Dimensions	**501×2436×845 mm**

Housing

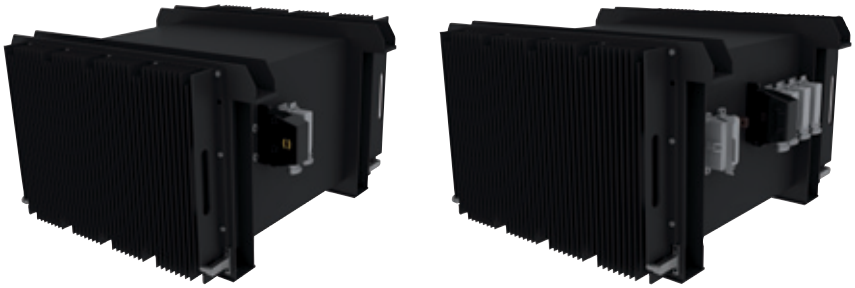


Block diagram



PSM-45W

Static Converter

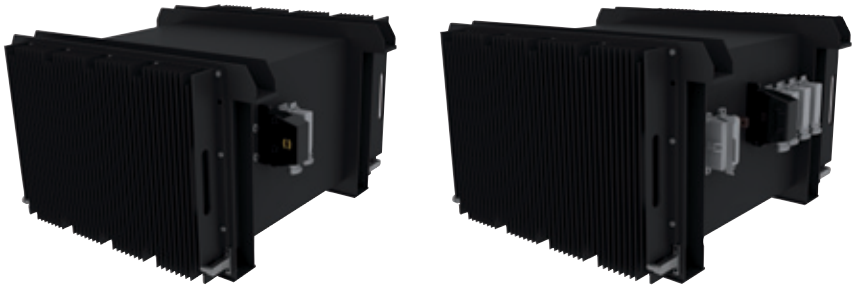


The PSM-45 static converter has been designed to convert 3000 V (DC or AC) used in the railway traction networks into 110 VDC and 24 VDC as well as 3×380 VAC and 220 VAC, used in the low voltage systems of coaches. In standstill conditions (when the 3000 V power supply is off), the converter may be powered from the 3×380 VAC industrial network.

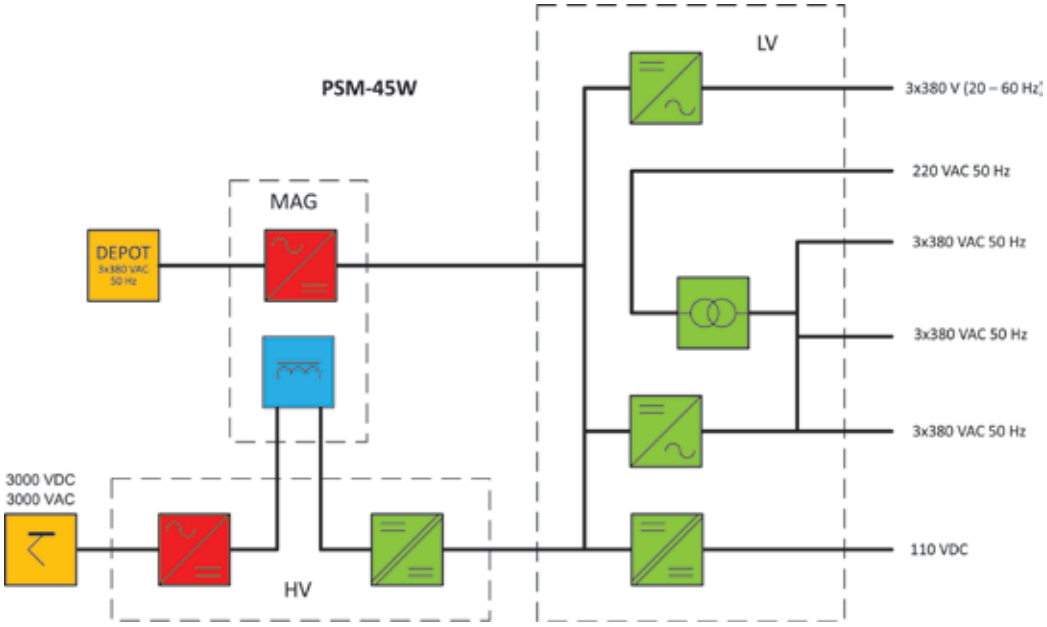
Specification	
Input voltage	**3000 V – 50 Hz** (operating range 2200÷3600 V) **3000 V – DC** (operating range 2200÷4000 V) 3×380 V – 50 Hz
Output voltage DC 1	**110 VDC**
P = 15 kW; Co-operation with the battery; Current stability ≤ ±2%; Voltage stability ≤ ±1% (temperature compensation)	
Output voltage AC 1/1	**3×380 V (50 Hz)**
P = 2 kW; Voltage stability ≤ ±5%; Frequency Stability ≤ ±1.0%; THD(u) ≤ 5%; Imax = 17 A	
Output voltage AC 1/2	**3×380 VAC (50 Hz)**
P = 8 kW; Voltage stability ≤ ±5%; Frequency stability ≤ ±1.0%; THD(u) ≤ 5%; Imax = 100 A	
Output voltage AC 1/3	**3×380 VAC (50 Hz)**
P = 8 kW; Voltage stability ≤ ±5%; Frequency stability ≤ ±1.0%; THD(u) ≤ 5%; Imax = 100 A	
Output voltage AC 2	**3×380 VAC (20–60 Hz)**
P = 3 kW; U/f regulation (152–456 V); THD(u) ≤ ±5%	
Output voltage AC 3	**220 VAC (50 Hz)**
P = 5 kW; Voltage stability ≤ ±5%; Frequency stability ≤ ±1.0%; THD(u) ≤ 5%; Imax = 23 A	
Output voltage DC 2	**110 VDC**
P = 1.5 kW; Voltage stability ≤ ±2%	
Output voltage DC 3	**24 VDC**
P = 1.5 kW; Voltage stability ≤ ±5%	
Total output power	**45 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–40 ÷ +40°C**
Protection ratio	**IP56**
Weight	**≤ 1200 kg**
Dimensions	**HV 606×1061×1000 mm** **LV 606×976×1000 mm**

PSM-45W

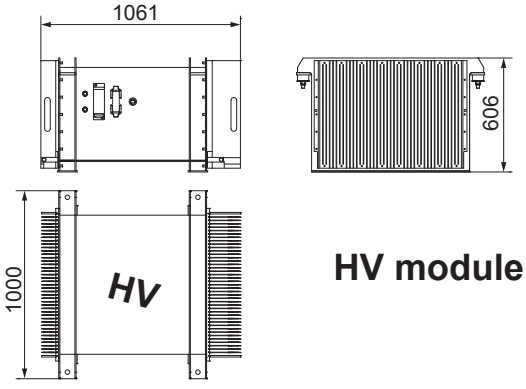
Static Converter



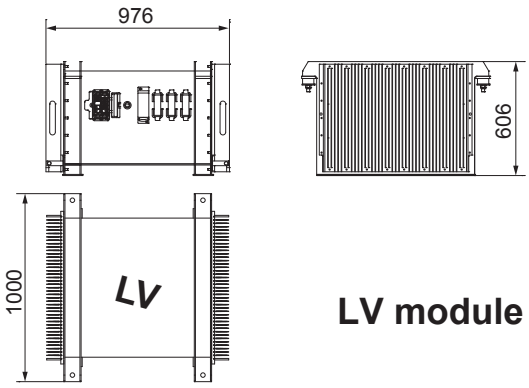
Block diagram



Housings



HV module



LV module

PSM-50-6NG

Static Converter

PSM-50-6NG is a single-system static converter designed to transform DC voltages (used in the European railway traction) – to the AC voltages (3×400 V and 230 V) and DC voltages (24 V) required in low voltage systems of traction vehicles.

The PSM-50-6NG converter is fully automated and provides a continuous power supply to the low-voltage circuits of railway coaches, regardless of the current input voltage.

The device can operate with supply from the power network of 3x400 V (power for platforms), which enables operation of 24 VDC power adapters and 3×400 V tram car receivers supplied with the voltage for platforms. When power is supplied from the overhead line and the power grid, the inverter draws power from the overhead line – operation supplied from the power grid may be used after disconnecting the overhead line.

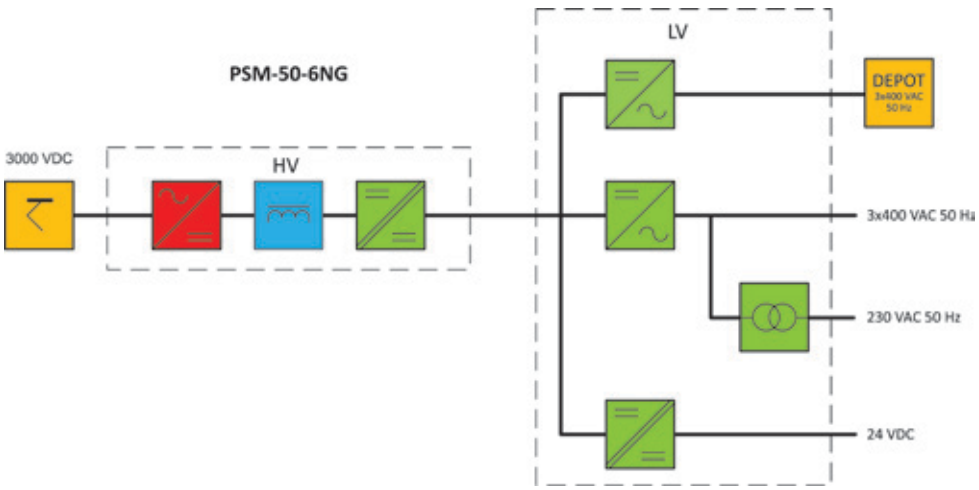
Operation of the inverter is controlled by the control system with two modules installed in HV and LV housings. The control system also generates alarm signals.

The inverter is equipped with a "self-start" system that provides power to the control system using the input voltage of the inverter. It provides the inverter's start-up without a connected battery pack.

The control system ensures high frequency stability, very good symmetry of the output voltage phases and a very low level of interference generated by the system.

PSM-50-6NG		
Input voltages		**3000 VDC** **3×400 V / 50 Hz**
DC Output		**24 VDC / 6,5 kW**
AC Output 1		**3×400 V / 50 Hz / 45 kVA**
AC Output 2		**230 V / 50 Hz / 5 kVA**
Housing		
Cooling method		**Natural air cooling**
Weight	**HV module**	**527 kg**
	LV module	**343 kg**
Dimensions	**HV module**	**2490×676×500 mm**
	LV module	**1950×676×500 mm**
Protection ratio	**Clean section**	**IP 56**

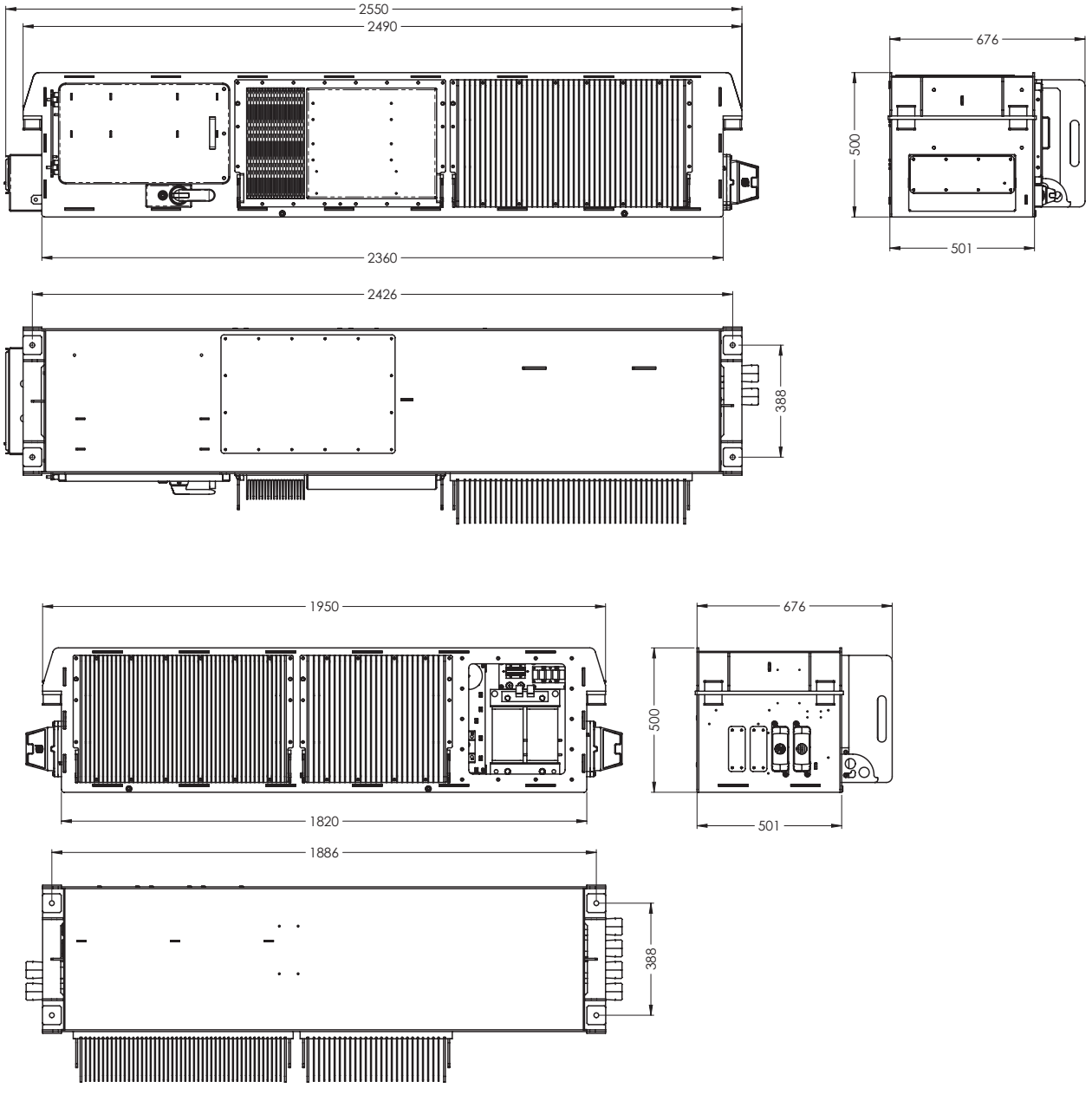
Block diagram



PSM-50-6NG

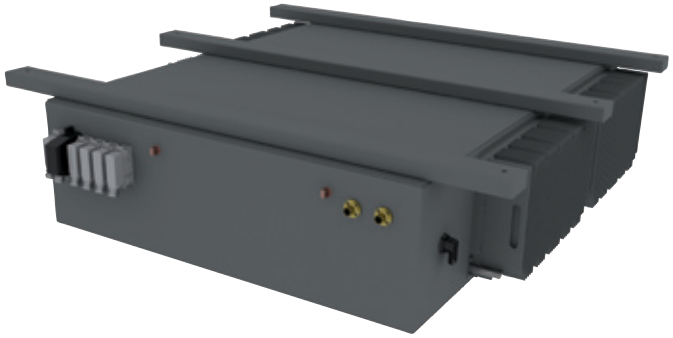
Static Converter

Housings



PSM-50W

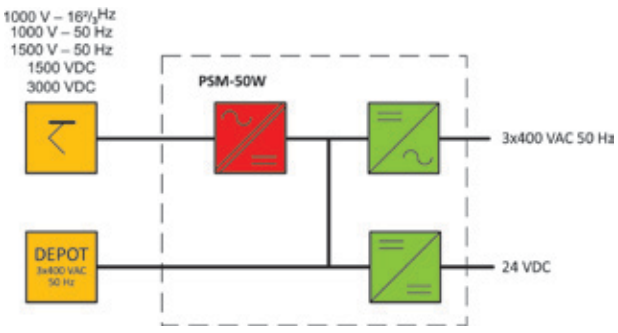
Static Converter



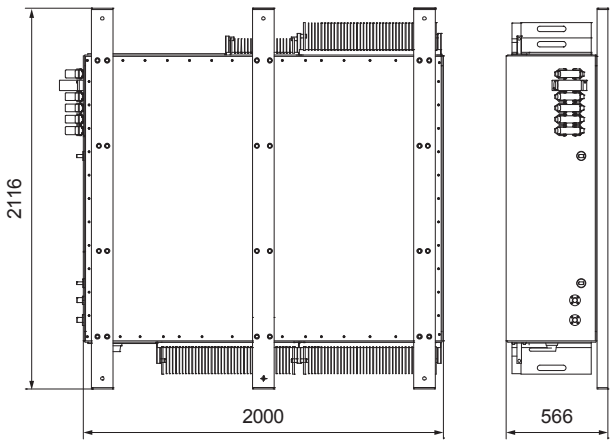
The PSM-50W static converter is a multi-system converter designed to convert DC and AC voltages used in the European railway traction, into 24 VDC, 3×400 VAC and 230 VAC, required in the low voltage systems of coaches.

Specification	
Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** **1000 V – 50 Hz** **1500 V – 50 Hz** **1500 V – DC** **3000 V – DC**
Output voltage	**24 VDC**
P = 6 kW; In = 230 A; Voltage stability ≤ ±1%; Voltage ripples ≤ ±0.5%; Battery charging current 10–100 A (adjustable); Battery charging voltage thermal compensation	
Output voltage	**3×400 V ~ (50 Hz)**
S = 44 kVA; In = 65 A; Voltage stability ≤ ±5%; THD(u) ≤ 5%; Overcurrent tolerance 200%/5 s	
Output voltage	**230V ~ (50 Hz)**
S = 6 kVA; In = 26 A; Overcurrent tolerance 150%; Voltage stability ≤ ±5%	
Rated power	**55 kW**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Weight	**950 kg ± 50 kg**
Dimensions	**2000×2116×566 mm**

Block diagram

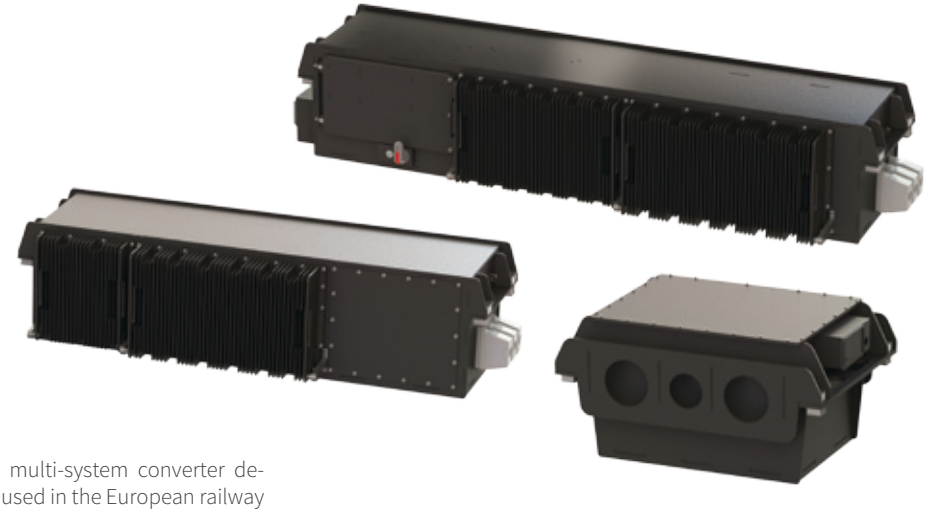


Housing



PSM-50W4

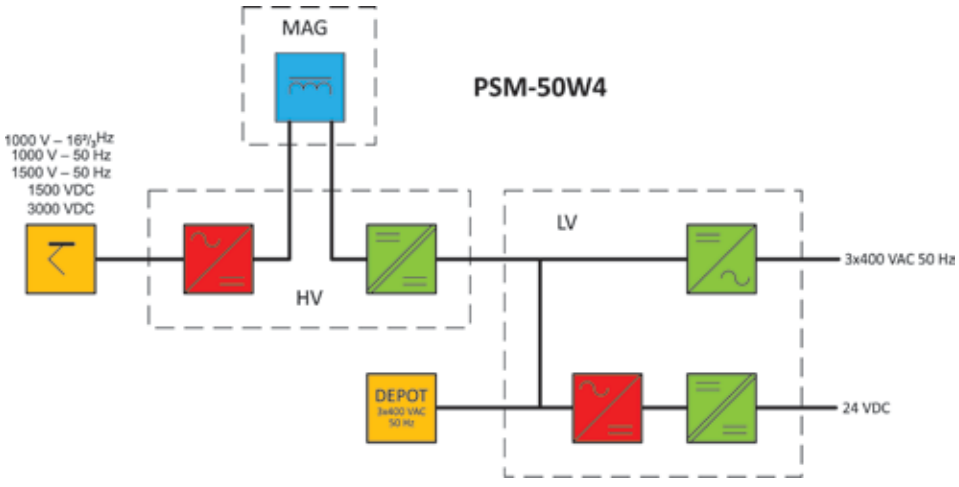
Static Converter



The PSM-50W4 static converter is a multi-system converter designed to convert DC and AC voltages used in the European railway traction, into 24 VDC, 3×400 VAC and 230 VAC, required in the low voltage systems of coaches.

Specification	
Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** **1000 V – 50 Hz** **1500 V – 50 Hz** **1500 V – DC** **3000 V – DC**
Output voltage	**24 VDC**
P = 6.5 kW; In = 230 A; Voltage stability ≤ ±1%; Voltage ripples ≤ ±0.5%; Battery charging current 10–135 A (adjustable); Battery charging voltage thermal compensation	
Output voltage	**3×400 VAC**
S = 53 kVA; In = 77 A; Voltage stability ≤ ±5%; THD(u) ≤ 5%; Overcurrent tolerance 200%/5 s	
Asymmetric load	**50%**
Optionally two outputs	**3×400 VAC with power of 45 kVA and 8 kVA**
Total output power	**50 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Dimensions	
Module HV Module MAG Module LV	**2490×916×501 mm** **1170×808×620 mm** **1950×680×501 mm**

Block diagram

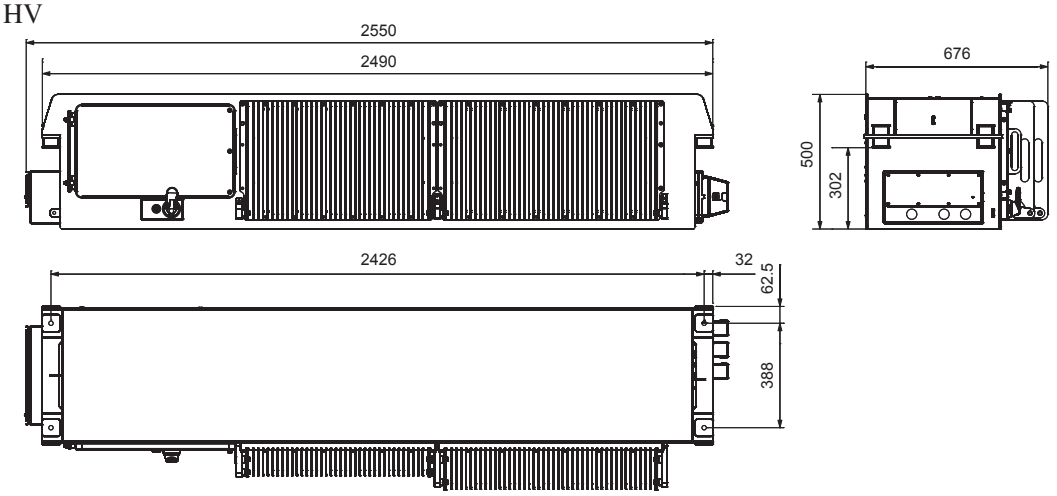


PSM-50W4

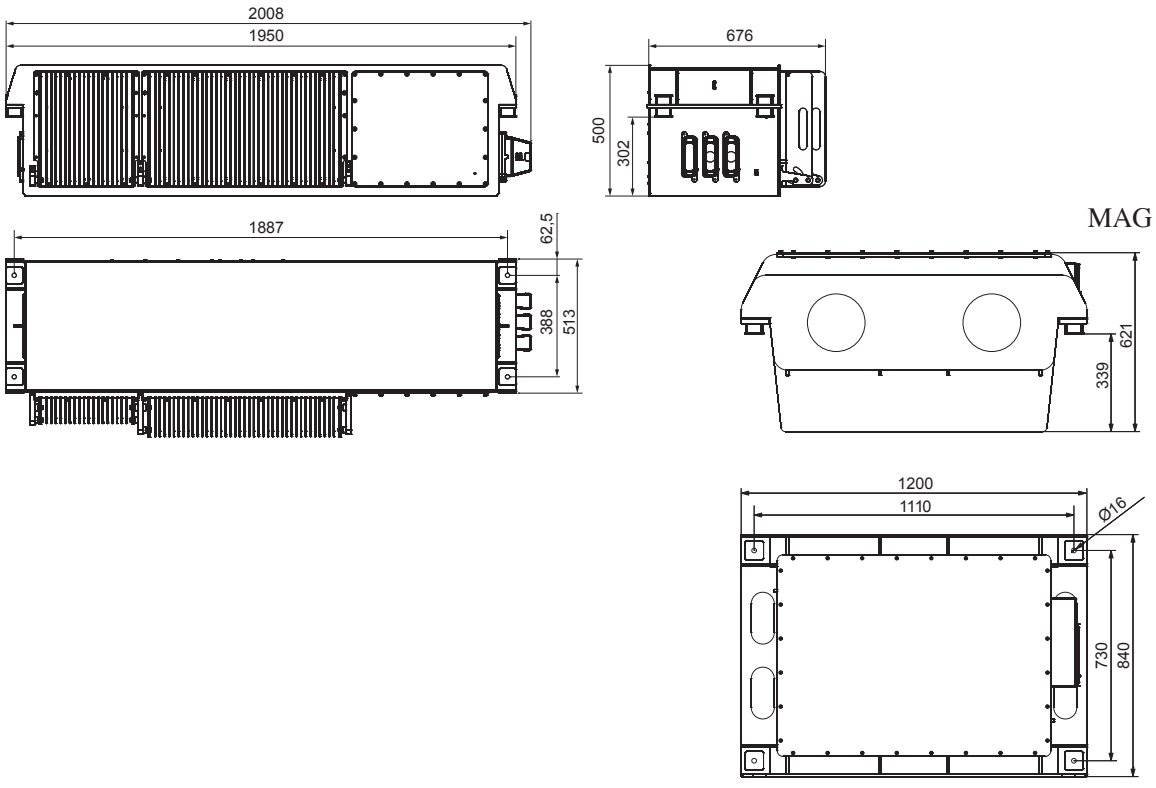
Static Converter

Housings

HV

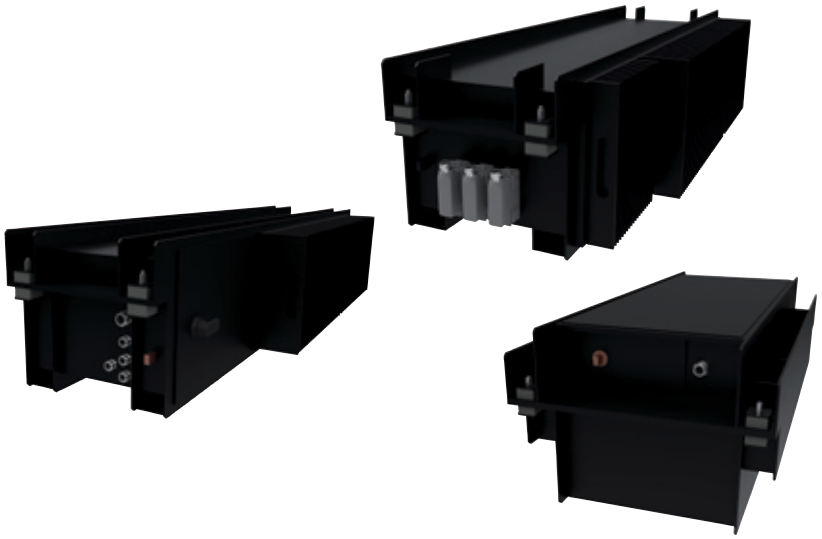


LV



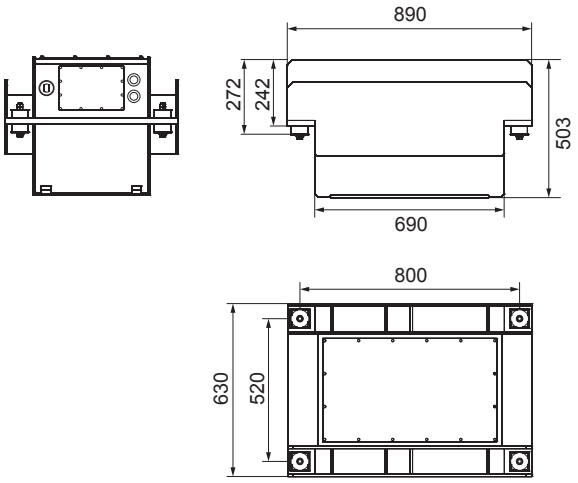
PSM-50W4B

Static Converter



The PSM-50W static converter is a multi-system converter designed to convert DC and AC voltages used in the European railway traction, into 24 VDC, 3×400 VAC and 230 VAC, required in the low voltage systems of coaches.

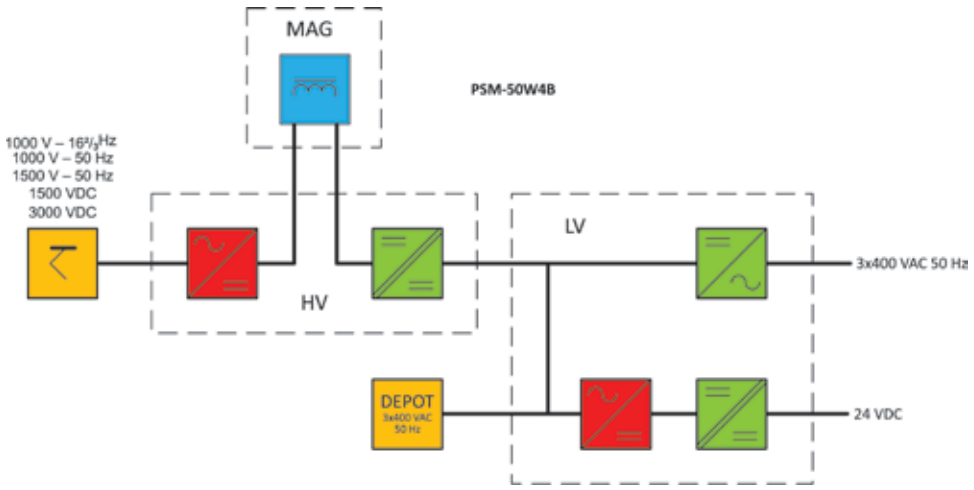
Housing of the AT Module



Specification

Input voltage	**1000 V – 16 $^{2}/_{3}$ Hz** **1000 V – 50 Hz** **1500 V – 50 Hz** **1500 V – DC** **3000 V – DC** **3000 V – 50 Hz**
Output voltage	**24 VDC**
P = 6.5 kW; In = 230 A; Voltage stability ≤ ±1%; Voltage ripples ≤ ±0.5%; Battery charging current 10–100 A (adjustable); Battery charging voltage thermal compensation	
Output voltage	**3×400 V ~ (50 Hz)**
S = 55 kVA; In = 80 A; Voltage stability ≤ ±5%; THD(u) ≤ 5%; Overcurrent 200%/5 s	
Asymmetric load	**50%**
Total output power	**60 kW**
Total efficiency	**≥ 83%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**IP56**
Dimensions	
Module HV	**2490×916×501 mm**
Module AT	**890×630×503 mm**
Module MAG	**1200×840×650 mm**
Module LV	**1950×680×501 mm**

Block diagram

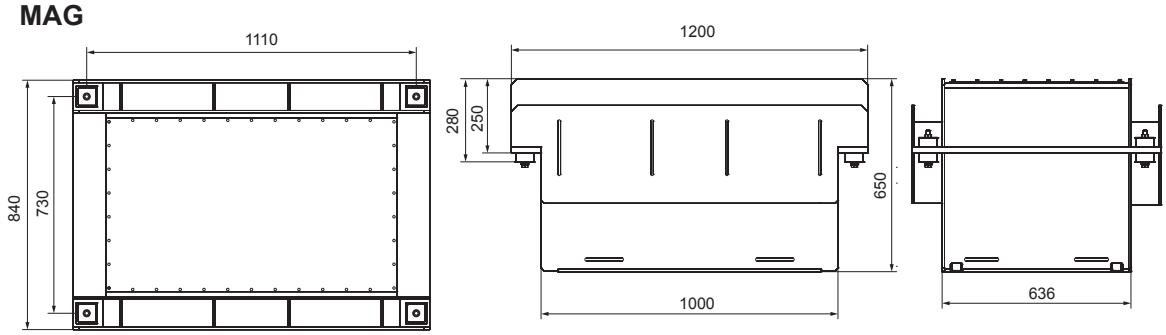


PSM-50W4B

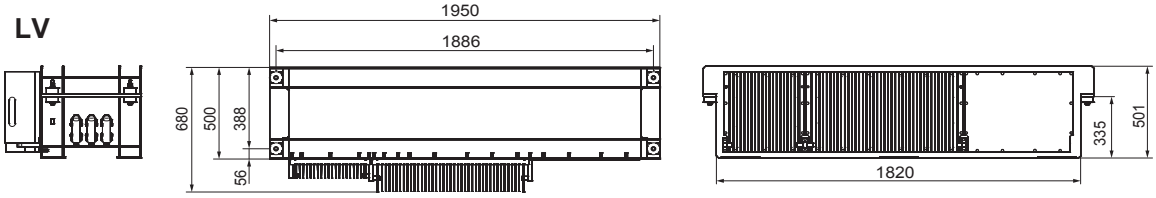
Static Converter

Housings

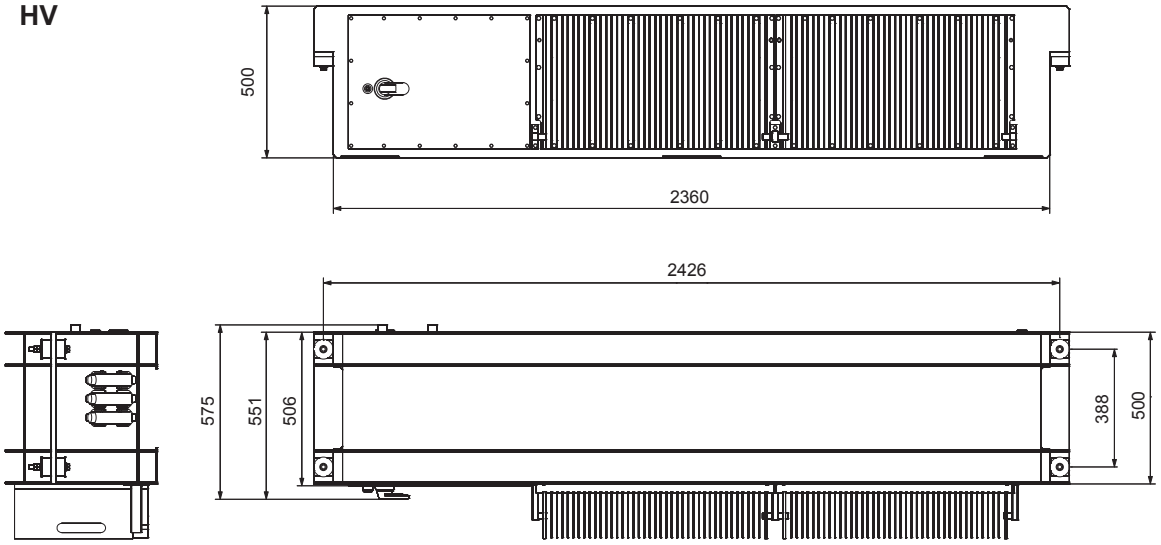
MAG



LV



HV



PSM-50WR1D

Static Converter

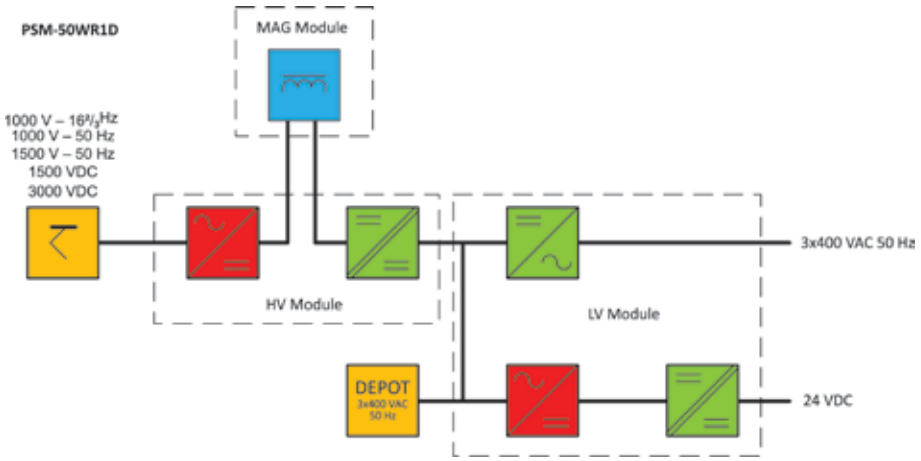
PSM-50WR1D is a multi-system static converter designed to transform AC and DC voltages (used in the European railway traction) – to the AC voltages (3x400V) and DC voltages (24 V) required in low voltage systems of traction vehicles.

The PSM-50WR1D converter is fully automated and provides a continuous power supply to the low-voltage circuits of railway coaches, regardless of the current input voltage.

The device can operate with supply from the power network of 3x400 V (power for platforms), which enables operation of 24 VDC power adapters and 3x400 V tram car receivers supplied with voltage for platforms. When power is supplied from the overhead line and the power grid, the inverter draws power from the overhead line – operation supplied from the power grid may be used after disconnecting the overhead line. The inverter is equipped with a "self-start" system that provides power to the control system using the input voltage of the inverter. It provides the inverter's start-up without a connected battery pack.

PSM-50WR1D		
Input voltages		**1000 V – 16²/3 Hz** **1000 V – 50 Hz** **1500 V – 50 Hz** **1500 VDC** **3000 VDC**
DC Output		**24 VDC / 8 kW**
AC Output		**3×400 V / 50 Hz / 70 kVA**
Housing		
Cooling method		**Natural air cooling**
Weight	**HV module**	**445 kg**
	LV module	**315 kg**
	MAG module	**715 kg**
Dimensions	**HV module**	**2550 x 676 x 500 mm**
	LV module	**1950×676×500 mm**
	MAG module	**1200×840×621 mm**
Protection ratio	**Clean section**	**IP 56**

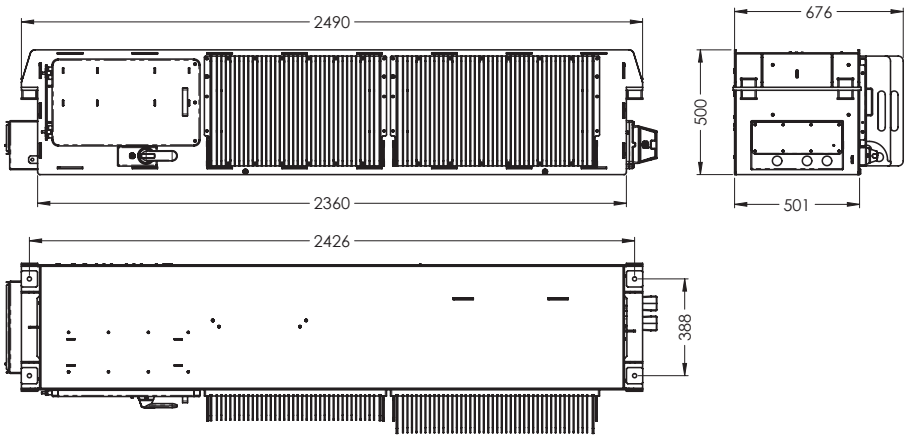
Block diagram

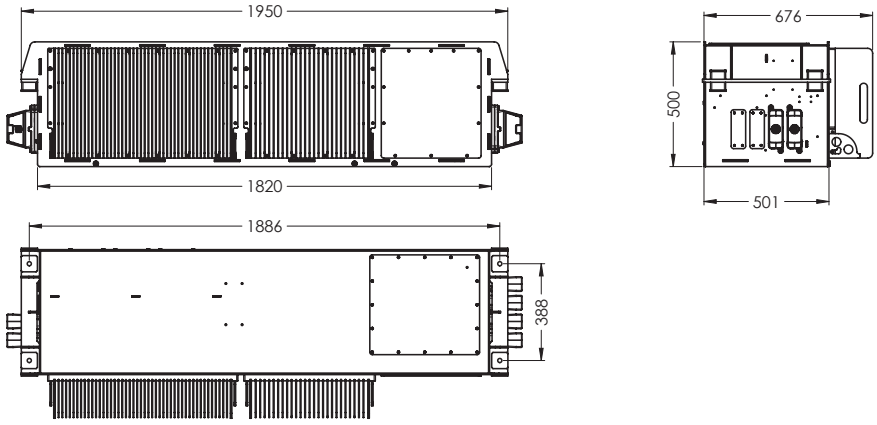


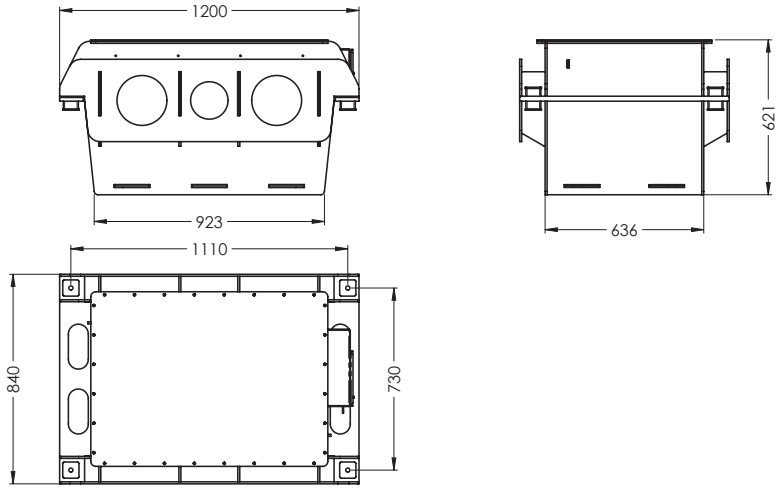
PSM-50WR1D

Static Converter

Housings







PSM-100WNC

Static Converter

MEDCOM APS PSM-100WNC for the application in passengers' coaches is designed with the application of state-of-the-art modern solutions provided by the world's technology: IGBT modules, Digital Signal Processors, modern magnetic materials, resin stabilization and others. The modern technological and circuitry solution provides excellent output parameters.

The converter's maintenance is optimized, and automatic control systems monitor the states of the outputs and protect them against overloads or short circuits. Every fault state is detected and followed by an appropriate alarm signal sent by CAN.
The controls of the converter are performed in DSP (Digital Signal Processor) technology.

The system is characterized by a low level of harmonics distortion in the output voltage, very high efficiency and high overload capability.

The applied bus-bar system in combination with a perfect IGBT driver guarantees a failure free performance upon short-circuits and eliminates the possibility of secondary damages in the case of transistor failure.

The applied polypropylene capacitors ensure a long service lifetime and resistance of the system against voltage changes in the traction network. The capacitors operating current is over dimensioned with reference to the max operating current and capacitors are doubled to lower the real value of current across the element. An additional mechanical protection cover suppressing the explosion energy is added. The converters meet the international and EN standards in safety and electromagnetic compatibility.

The system provides a very low level of interferences emitted to the traction network and loads.

The converters are equipped with a natural air-cooling system to cool down power elements (IGBTs).

The system operates within a wide range of external temperatures. The diagnostics and control of the converters are provided via a defined interface.

The converter is a high power multi-system device based on IGBT technology.

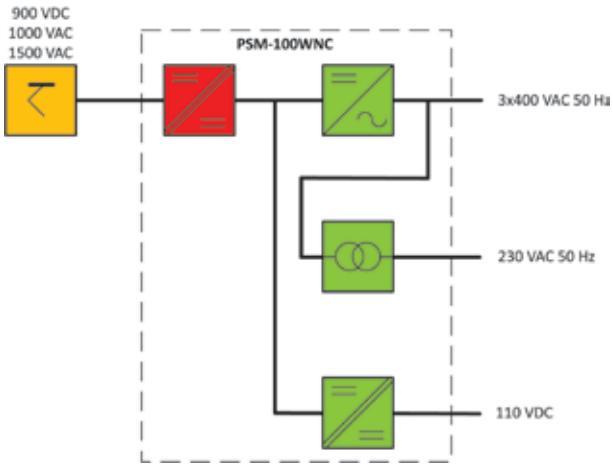
The static converter PSM-100WNC is a fully automated device designed for converting the traction power supply voltage 900 V DC, 1000 V AC and 1500 V AC to 110 V DC voltage of auxiliary circuits, 3×400 V / 50 Hz, and 1×230 V / 50 Hz and batteries charging. The device uses the technique of the multiple conversion of energy.

High voltage from the loco power line (900 V DC or 1500 V AC) is converted into an HF alternating voltage and then transformed and rectified to obtain low-voltages (voltage inverter and the output voltage of 110 V). The 110 V output voltage is adjusted to the charge status of the battery cooperating with the converter so that the charging current of the connected battery is not exceeded. In the case of overload of the converter an internal current limit circuit operates.

The PSM-100WNC converter is mounted under the frame of every passenger coach. Access to its components is provided on the side of the vehicle, after removing the side flaps and bottom covers.

PSM-100WNC		
Input voltages	**900 VDC** **1000 VDC** **1500 VDC**	
DC Output	**110 VDC / 11 kW**	
AC Output 1	**3×400 V / 50 Hz / 84 kVA**	
AC Output 2	**230 V / 50 Hz / 10 kVA**	
Housing		
Cooling method	**Natural air cooling**	
Weight	**1209 kg**	
Dimensions	**2000×1900×600 mm**	
Protection ratio	**Clean section**	**IP 65**

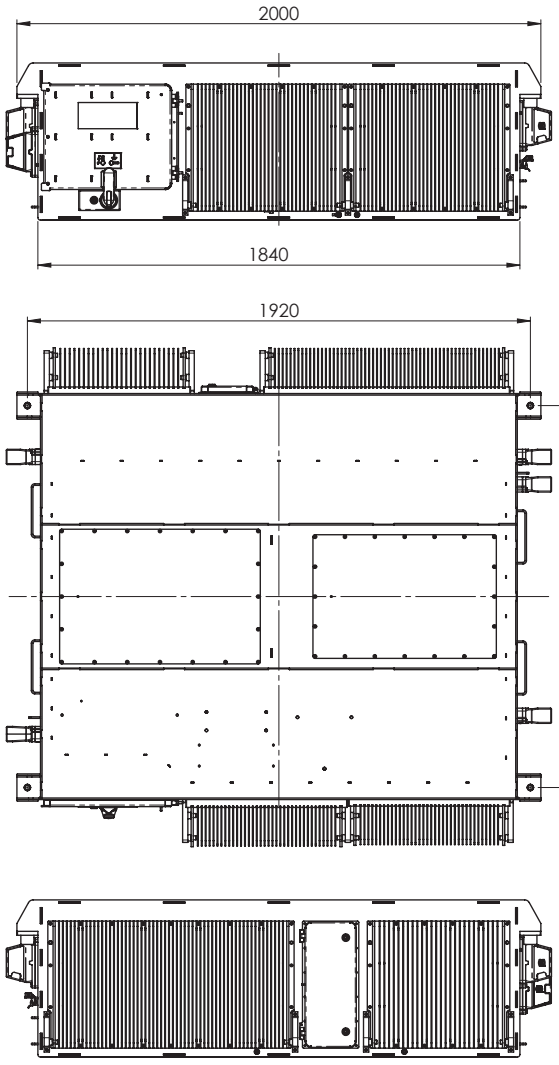
Block diagram

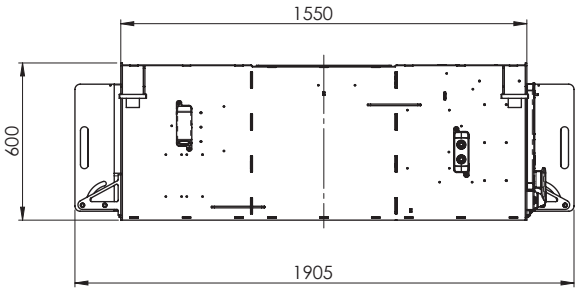


PSM-100WNC

Static Converter

Housings





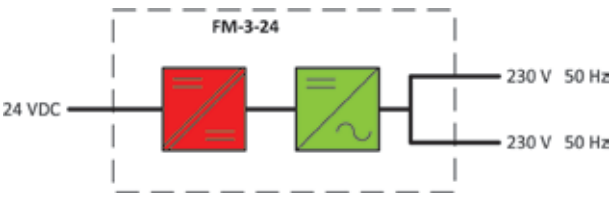
FM-3-24

DC/AC Converter

The FM-3-24 DC/AC converter has been designed to convert on-board 24 VDC into 230 VAC for powering low voltage systems of coaches (laptops, shavers, TV etc.). It may be installed in the Rack 19" type housing or wall-mount housing. The output voltage shape is a pure sine wave. It operates from the on-board battery, providing an uninterruptible output.

Specification	
Rated power	**3 kVA**
Input rated voltage	**24 VDC**
Output voltage	**230 VAC, 50 Hz**
Output voltage stability	**≤ ±5%**
Output voltage frequency stability	**≤ ±0.2%**
THD(u) in the output voltage	**≤ 3%**
Overload tolerance	**125%/10 s**
Total efficiency	**≥ 80%**
Ambient temperature	**–30 ÷ +40°C**
Protection ratio	**Rack 19" (IP21) wall-mount (IP20)**
Weight	**28 kg**
Dimensions	**222×483×486 mm (rack) 427×442×232 mm (wall-mount)**

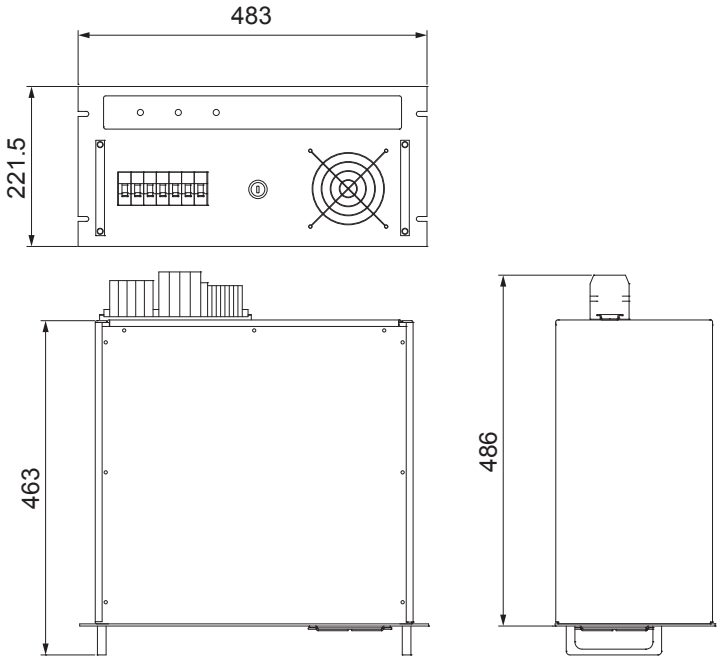
Block diagram



FM-3-24

DC/AC Converter

Housing (rack)



Housing (wall-mount)