

Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles



This new modular **Power System for Military Ground Vehicles** based on a standard box incorporating up to three different power modules. The power inlet module (230 Vac) includes line filter, lightning protection (optional) and also an engine immobiliser and automatic kick-off connector. Another module is generating a clean and isolated line voltage of 230 Vac up to 12 A. This revolutionary concept is based on a new innovative high frequency transformer which saves about 70 % weight and volume compared to a conventional 50 Hz-transformer.

The clean 230 Vac-line is protected via a fault current protection switch (RCD) and can now be used for any consumer in the car like battery charger, computer a.s.o.

Another available module is a AC/DC-power back-up system with battery charger which is able to charge lead acid batteries up to 60 A (optional 100 A) at 24 Vdc / 28 Vdc.

More intermediate bus converter modules according to the new German military standard VG 96916-20 are available and all can be plugged into this standard power box system.

- Safe power for military ground vehicles (tanks, trucks, containers)
- Output power 1 kVA - 3 kVA
- Automatic power line disconnection at alarm start
- Input from distorted power lines and 230 Vac-emergency-generators
- Light weight high-frequency transformer
- Modular design for versatile use
- Flexible plug-in modules
- AC/AC-converter module
- Battery charger module up to 100 A
- DC/DC-modules acc. to VG-96916
- Lightning protection (up to 20 kA)
- EMI: MIL-Std 461 (optional)
- Protection class II (reinforced Isolation)
- High isolation 4 kV (DIN/EN61558)
- Input-output Isolation EN60950
- Protection degree IP 54 (or IP 65)
- Operating: -46 °C bis +85 °C

Higher power systems (up to 14 kVA) available with 3-phase input

Features:

- AC/AC and DC/DC power supply
- Connection to unknown 110 Vac / 230 Vac line systems (TN, TT-Systems) and generators
- Battery back-up + charging
- Intermediate bus voltage generation 400 Vdc - 650 Vdc
- Power line filter and lightning protection

Ask for further technical information!
Functional or interface modifications can be realized on request. Each configuration change causes a new type number.

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Available Modules:



Module NA-230-AW

Power Line Connection Module with Standard CEE-Plug and automatic disconnection and/or engine immobiliser
Option FI: EMI-Filter and Lightning Protector (build-in in Module NA)

type number 00992



Module NA-230

Powerline Connection Module with Standard CEE-Plug (230 Vac single Phase)

type number 01021



Module AC-TT

AC / AC High-Frequency-Isolation-Transformer
Output Power 2,5 kVA (Class II equipment)

type number 01020



Module DC-BAT

Battery-Back-Up Supply and Charger
28 Vdc / 60 A (80 A pk) Input: 400 Vdc

type number 00996



Module AC-BAT

Back-Up Power Supply and Charger 28 Vdc / 60 A
Input: 230 Vac with reinforced isolation (Class II)

type number 01022



Module DC-TT

AC / DC High-Frequency-Transformer 2,5 kVA
(230 Vac into 400 Vdc – Intermediate Bus)

type number 01023



Power Box „MoFess“

Enclosure Box for up to 3 Modules

type numbers: 00991 | 00994
| 01029 | 01030



Module SV-1224

DC / DC Intermediate Bus Voltage Converter
Dual Output: 12 Vdc / 20 A and 24 Vdc / 10 A
(Consult Factory for other Voltages / Currents)

type number 01024



Module NA-230-ST

Stand-alone Power Line Connection Module with Standard CEE-Plug (no enclosure required)

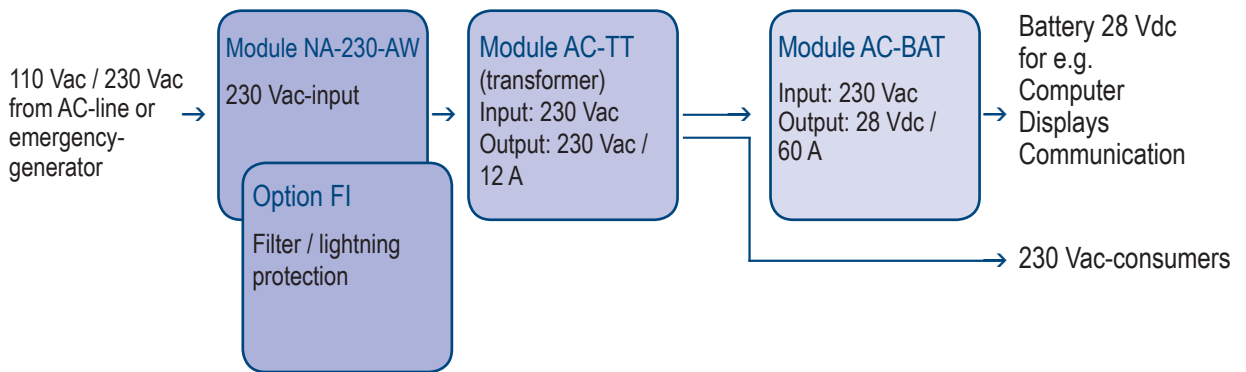
type number 01025

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Block Diagram

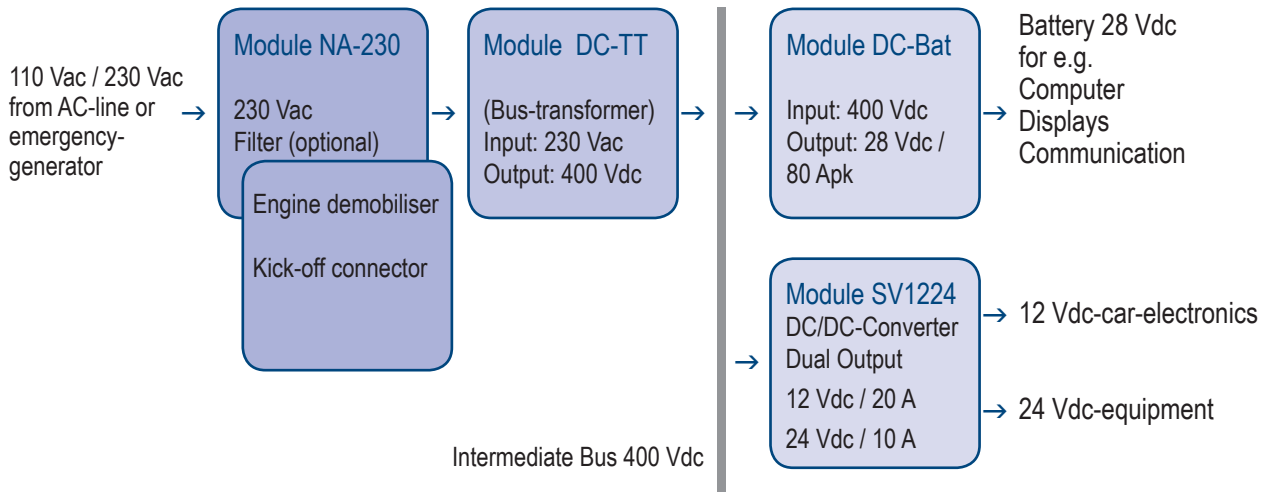
Modular Energy Generation and Distribution System

Typical application: AC-line input-module with EMC-Filter / lightning protection, high-isolation AC / AC-transformer and battery charger



Typical application with Intermediate Bus Voltage:

AC-line Input-Module with automatic kick-off-Connector, EMC-Filter /Lightning protection, AC / DC-Bustransformer and Battery charger



Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles



Module NA-230-AW: type number 00992
Module NA-230: type number 01021
(AC-Line connection Module 230 Vac)

Technical Specifications:

- AC-connector according to VG (3pole)
- Engine immobiliser
- NA-230-AW: automatic kick-off for power connector at engine start
- Manual connector release
- Water proof box to meet IP 54 - IP 65
- Protection Class II
- Weight appr. 5 kg

Option FI (EMC-Filter and Lightning Protection)

- Line filter acc. to MIL810 (VG or other MIL-Std. on request)
- Lightning protection up to 20 kA
- NEMP / tempest-line filter
- Weight: approx. 1 kg



Module AC-TT High Frequency AC / AC-Transformer type number 01020

Build to meet:	VDE/EN61558 (Isolation transformer)
Input voltage:	230 Vac (-15 +10 %) / 45 Hz - 400 Hz (optional: 115 Vac)
Harmonics:	Power factor corrected to EN/DIN 61000-3-2 (PFC)
optional:	Wide Input 95 Vac - 264 Vac / 50 Hz - 60 Hz

Ask for further technical information!
Functional or interface modifications can be realized on request. Each configuration change causes a new type number.

Inrush current:	< 30 A
Fuse:	16 AT
Safety-isolation:	5000 Vdc /prim-sec. acc. to VDE 0100-410
Protection class:	II (no protective earth)
Safety:	EN 60950
EMC / EMI:	filtered to meet EN55022 / A MIL810 (optional others) EN61000-4-2
Transients:	EN61000-4-4, and 61000-4-5
CE-conformity:	Manufacturers declaration
Output power:	2,4 kVA at 230 Vac 1,4 kVA at 115 Vac
Output voltage:	230 Vac / 50 Hz +10 % to -15 % (or 60 Hz)
Current:	Version 1: 8 A Version 2: 12 A
Fault current protection:	RCD-Protector optional
Weight:	approx. 4 kg

Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles



Module DC-BAT
Battery Back-up Power Supply and Charger
type number 00996

Technical Specifications:

Input (AC-BAT):	230 Vac / 50Hz - 400 Hz (-15 % to +10 %)
Input (DC-BAT):	400 Vdc (from intermediate bus)
Fuse:	16 A (magn. tripped)
Output voltage:	24 Vdc to 28 Vdc
Tolerance:	-0,5 Vdc to +0,0 Vdc
Current (charger):	60 A / 80 A pk (Derate above +50 °C)
Overcurrent:	short circuit protected
No load:	no minimum load
Current limit:	typ. 110 %
Battery type:	Lead acid batteries up to 200 Ah
Weight:	approx. 3,5 kg



Module DC-TT
High Frequency AC / DC-Converter
type number 01023

Technical Specifications:

Input:	230 Vac / 50 Hz - 400 Hz (-15 % to +10 %)
Optional:	Wide input 110 Vac to 230 Vac
Fuse:	16 A
Output voltage:	400 Vdc
Current:	8 A
Overcurrent:	short circuit protected
No load:	no minimum load
Current limit:	typ. 110 %
Optical indicator:	Input AC-OK Overload DC-Out ok
Weight :	approx. 4 kg

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Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles



Module SV-1224 Dual Output Power Supply
type number 01024

Technical Specifications:

Input:	400 Vdc (from intermediate bus) (optional AC-input)
Fuse:	16 A (magn. tripped)
Output 1:	12 Vdc up to 20 A
Output 2:	24 Vdc to 28 Vdc up to 10 A
Overcurrent:	short circuit protected
No load:	no minimum load
Current limit:	typ. 110 %
Weight:	approx. 3,5 kg

Typical application:



AC-line input-module with automatic kick-off-connector,
EMC-filter / lightning protection, high-isolation AC / AC-
transformer and one blank panel



AC-line input-module with engine immobiliser and high-
isolation batterycharger (SELV)

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request. Each configuration change causes a new type
number.

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Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles



Rear View: Box with 80 A power-connector (left) and signal connectors

Power Box Mxx *)

For direct assembling in car bodies (standard box system)

Optional Signals:

- Alarm
- Power ok
- Battery low
- Power disconnect

Technical Specifications:

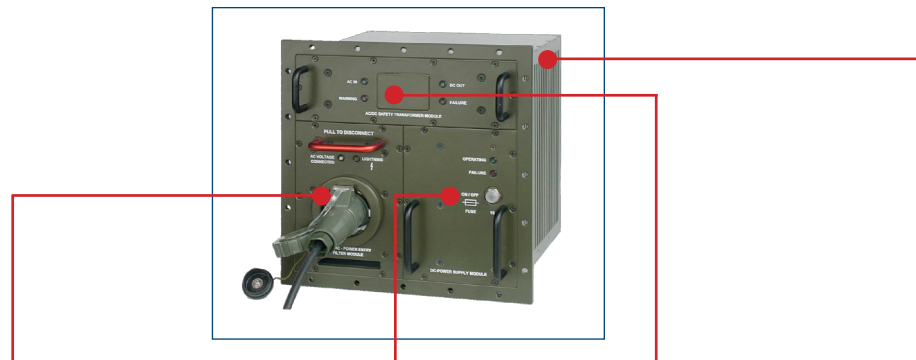
Protection:	IP 54 (optional to IP 65)
Temperature operating:	-20 °C to +70 °C optional: -46 °C to +70 °C
Dimensions:	353 x 353 x 298 mm (W x H x D) Depth may vary up to 400 mm depending on backplane-version
Weight:	approx. 4 kg (without modules)
Connectors:	depend on used options
Ground terminal:	2 Bolts M8
Signals:	6 pin Connector (female)
Mounting:	20 screws (M6)
EMC-gasket:	optional on frontside
Sealing (front):	Rubber sealing (waterproof)
Material / Colour:	Aluminium / RAL 6031 green
Shock / Vibration:	acc. to MIL810G

*) Final version varies on customers requests (power level, number of used modules, type of connectors a.s.o.)

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Modular Power System acc. VG 96916-20 „MoFess“ Module for Military Ground Vehicles Overview of possible Modul combinations



01026
Modul NA-230-LD
CEE Connector
+ Lightning
Detection

01021
Modul NA-230
CEE Connector

00996
Modul DC-BAT
400 Vdc →
24 (28) Vdc

00995
Modul AC-TT-RCD
with RCD- prot.
230 Vac →
230 Vac

00991
Power Box
configured with
connectors for
X-Pwr, P-Out, P-In
Control & Signal

01027
Modul NA-230-
AW-LD
CEE Connector
+ Lightning
Detection

00992
Modul NA-230-AW
CEE Connector

01022
Modul AC-BAT
230 Vac → 24
(28) Vdc

01020
Modul AC-TT
without RCD- prot.
230 Vac →
230 Vac

00994
Power Box
configured with
connectors for
Pwr-Out, Pwr-In,
Control & Signal

01032
Modul NA-400-
AW-LD
CEE Connector
+ Lightning
Detection

01031
Modul NA-400-AW
CEE Connector

01024
Modul SV-1224
400 Vdc
↳ 24 (28) Vdc
↳ 12 Vdc

01023
Modul DC-TT
AC/DC Converter
230 Vac →
400 Vdc

01029
Power Box
configured with
connectors for
X-Pwr, Pwr-In,
Control & Signal

01025
Modul NA-230-ST
CEE Connector
Stand alone /
Case

01028
Dummy Panel

01030
Power Box
configured with
connectors for
Power-In,
Control & Signal