

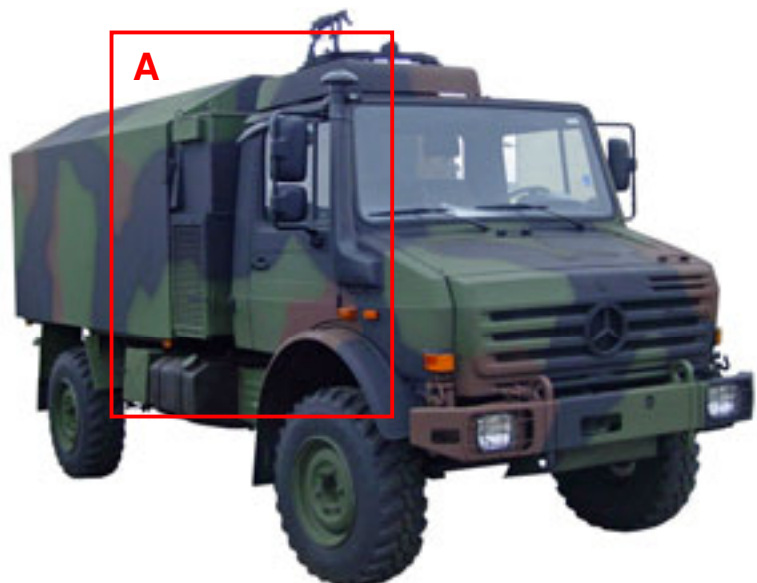
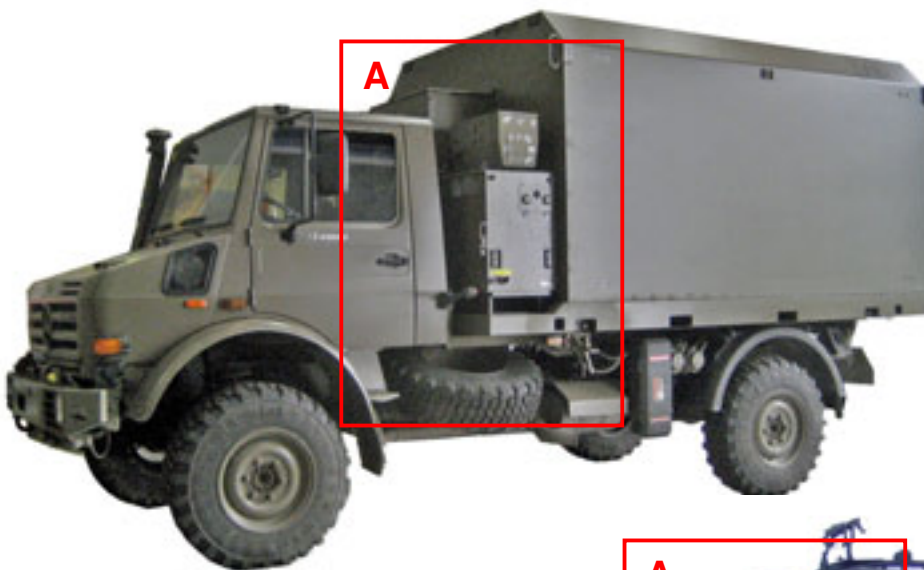
ELNIC COMPETENCE FOR UNIMOG-BASED SYSTEMS AND ACCESSORIES

Elnic has different solutions for Unimog-based systems and accessories.

Our competence consists of:

- A. electrical power supply and air conditioning WSK UN
- B. self-sufficient air conditioning AKA
- C. signal filtering modules
- D. charge infeed module

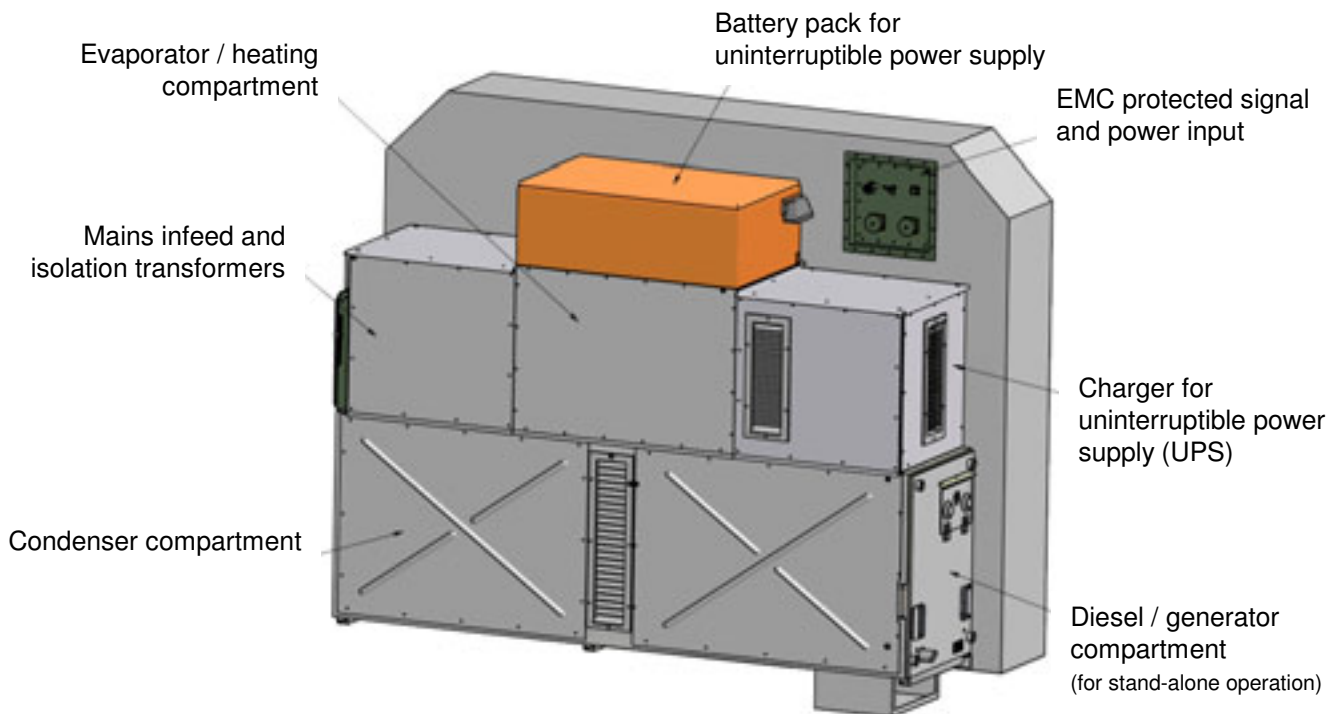
On the following pages you will find further information on the different applications.



A. COMBINED POWER SUPPLY AND AIR CONDITIONING WSK-UN FOR INSTALLATION IN SUPERSTRUCTURES

Combined power supply, air conditioning and mains infeed system for mobile shelters and engineering cabins.

The world-wide application of mobile cabins and containers requires self-sufficient power supply systems for electricity and air conditioning. The WSK-UN can be used as complete unit diesel / generator / air conditioning / re-circulating air module and mains infeed system. The re-circulating air module with evaporator and heating can be installed separately as a split unit.



	WSK UN	
	A/C Version	D/C Version
input to cabin	230V 50 Hz	28 V
Voltage	4 kW	100 A
max. electrical power	4.5 kW	4.5 kW
cooling power	5 kW	5 kW
option: combustion heater	4 kW	-----
option: electric heating		

Functionality: standard module

The diesel engine runs with a constant speed of about 3,000 rpm (depending on the power range). The generator is mechanically driven directly by the diesel engine, whereas the compressor is driven by an electric engine. Via a second coolant cycle, rack-cooling modules can be connected to an own electronic expansion valve. The rack-cooling modules can cool and heat independent of the cabin system.

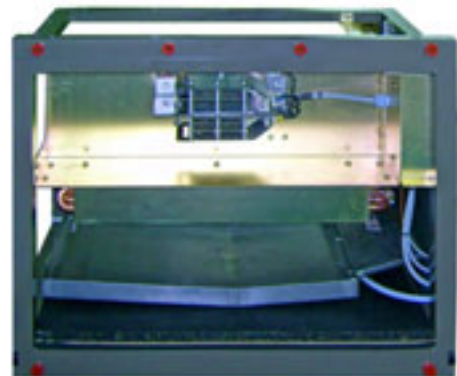


Option : Mode of operation rack-cooling

The WSK can operate several rack-cooling modules. Cooling the electronic equipment separately is an advantage here. This ensures fast operational readiness for the overall system and completely independent regulation of the cabin internal temperature.

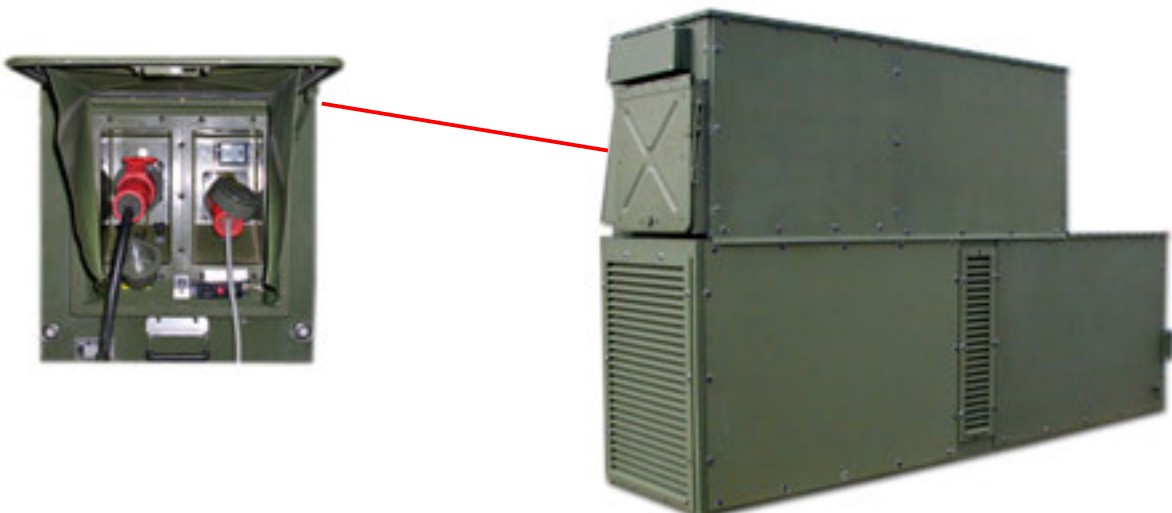
Functionality: re-circulating air module / fresh air module

The standard cooling/heating module has a cooling capacity of 4.5 kW. Several modules may be operated simultaneously in one cabin in order to reach larger temperature difference ratings, when necessary. Due to the fact that these modules have their own expansion valve, separate cooling air cycles are also possible (rack-cooling separate from room air). Heating is done via an integrated electric heating register or, additionally, with the help of a combustion heater. The supply of fresh air can be adjusted.



Functionality: mains connection

In this case the diesel engine is disconnected. The electric engine drives the protectively insulated air conditioner. The cabin is supplied with electric power via a minimised isolation transformer.



Functionality: NBC-protection

The basic concept applied for collective protection is overpressure and filtration. By filtering the air that enters the shelter and keeping the internal air pressure higher than the external pressure, the contaminated external air is prevented from entering the shelter and this results in a toxic-free work area and thus relieves users from wearing protective masks and clothes. A contaminated filter has to be replaced on the outside.



Functionality: pull-out

The generator set is installed on pull-out bars. Fuel supply and electric cabling is guided through plastic cable chains. The re-circulating air module is fixed to or in the cabin and is supplied via flexible coolant hoses.



Functionality: reserve fuel tank

The WSK may be operated both via the fuel tank of the vehicle (diesel) or its own tanks (all sizes possible). Optionally, a two-hour spare fuel tank with an own pump can be used. Using kerosene instead of diesel has been tried and tested.

B. SELF-SUFFICIENT AIR CONDITIONER AKA

Range of application

New task areas of the Armed Forces require flexible, easily adaptable and expandable air conditioners with a universal range of application, especially for existing systems.

The product family "AKA - self-sufficient air conditioners" was developed especially for this purpose. This solution offers a flexible air conditioning system with an almost unlimited spectrum of use.

When the AKA was designed and developed, it was made sure that retrofitting the system would be as easy as possible with only minor changes to the existing system.



Basic Concept

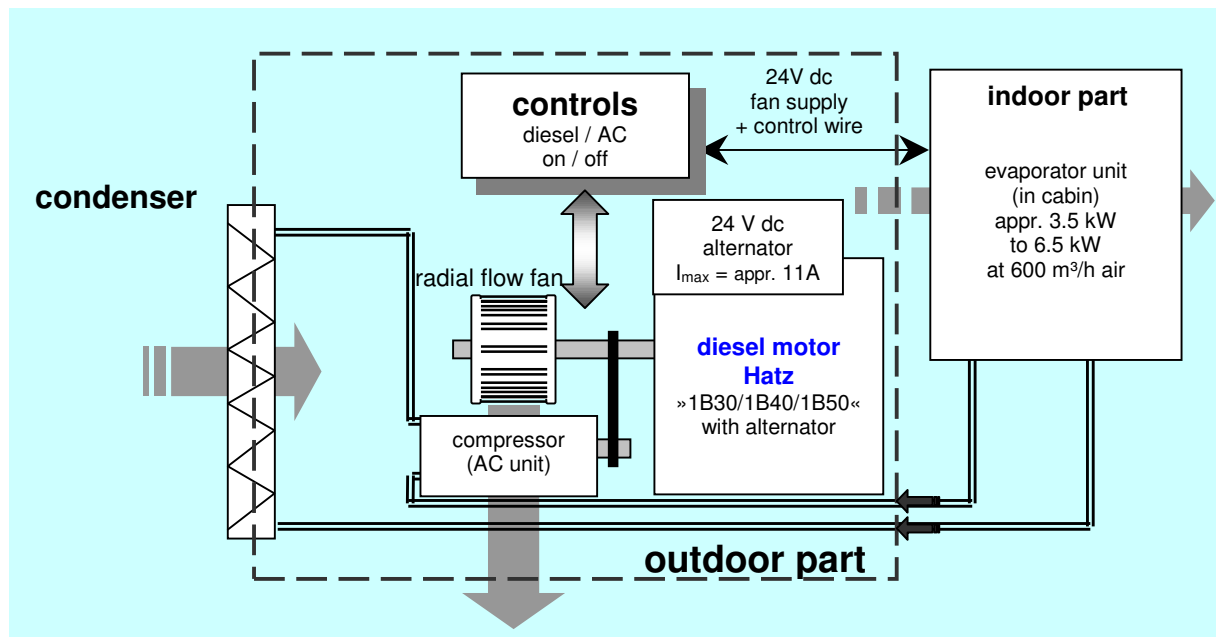
Essentially, the AKA is a split air conditioning system. The outdoor part contains a diesel drive with AC compressor and condenser. The indoor part consists of an evaporator and a re-circulating air fan. The two components are connected by refrigerant hoses, electrical control wires and supply lines. Due to its modular form the inside part may be adapted relatively easy and fast to its wished-for place of installation.

The engine (diesel) of the air conditioning unit can be switched on with the starter (24V DC supply from the vehicle/cabin) or manually with the reversing starter.

The AKA supplies itself during operation with the help of the integrated alternator. It is therefore totally self-sufficient from the transporting vehicle with regards to the electrical supply.

The refrigerating capacity ranges from 3.5 to 6.5kW for outside temperatures of up to 49°C. Operation is permissible to 55°C.

AKA Overview



AKA System: different options

- AKA1:** Air conditioning performance 4.5 kW, Motor Hatz 1B40
- AKA2 (Light):** Reduced air conditioning performance (approx. 3.5kW) with smaller, lighter Diesel Engine (Hatz 1B30). Weight reduction approx. 35 kg.
- AKA3 (Electric):** Diesel engine replaced by a 4.5 kW electric motor, so the AKA can only be operated with a connection to an external network.
- AKA4 (Heavy Duty):** An alternating voltage generator of approx. 2.0 kVA is added to the outdoor part, so in addition to the refrigerating capacity, electricity is also available.
- AKA5:** Cooling performance 6,5 kW, Motor Hatz 1B50, especially developed to be installed on existing vehicles.

AKA Application Matrix

Type	Application	Solution
AKA1-2	Unimog with FM I cabin	Outdoor part fixed on a mounted bracket in front of the bumper. Indoor part pushed through a standard cut-out B and installed.
AKA4	Unimog with FM I cabin Extra need for electrical power	Outdoor part as "AKA heavy Duty" (with additional AC-generator) on mounted brackets in front of the bumper. Indoor part pushed through a standard cut-out B and installed.
AKA1-5	Mobile FM cabin as quasi-stationary work space.	Outdoor part set up in the necessary configuration, separate from the cabin. Indoor part pushed through a standard cut-out B and installed.
AKA2	Easily transportable system (air transport!)	Outdoor part "AKA Ultra" (small weight!). Indoor part with the necessary mechanical layout.
AKA1-5	Tent refrigeration	Outdoor part in the necessary configuration - also with external mains supply – set up separate from the tent!. Indoor part with the necessary mechanical layout.
AKA1, 2, 4 and 5	System to install on top of shielded and unshielded vehicles	Casing and construction for additional installation to existing vehicles. Air conditioning and control connections are put in the inside room, the installation of the evaporator is project-specific.



power section



indoor part



control panel

Logistics

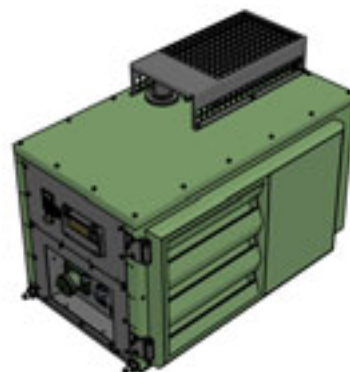
Experience shows, it is difficult to protect devices that are installed on the outside of military vehicles against all adverse conditions (dust, water, damage, etc.). If an AKA breaks down, this should not lead to a longer downtime of the system.



Therefore the AKA may be replaced easily and without special tools. The replacement unit may be put into operation fairly fast with the available quick-action couplings for the refrigerant lines and fuel pipes as well as the plugs of the control lines.



Inside part with evaporator (6.5 kW)



Power unit (6.5 kW)

C. SIGNAL FILTERING MODULE



Signal filtering modules are designed to filter digital and analogue data and signal lines into shielded rooms and cabins.

For maximum flexibility, the modules can be delivered from 8 up to 50 lines per module.

Due to high insertion loss and screen absorption they can be used for EMC and TEMPEST* requirements.

- Qualified according to German military standard VG 96903, 50 kA 10/350 μ s per module
- Applicable in MOSAK** infeed cases
- Modular set-up, hence:
 - customised configurations with short delivery deadline and good serial prices
 - fast maintenance and repair on site
 - easy logistics due to uniform sub-modules

The ever-progressive cross-linkage of shielded cabins or vehicles requires an adaptation of filter modules to the most different digital and analogue communication and data lines. In addition, the amount of equipment per project is reduced due to minimal financial resources.

The procurement costs of our filter modules is minimised because they can be configured completely independent and external lightning protection becomes unnecessary due to the full lightning current carrying capacity per cable according to mil. standard VG 96901 part 4.

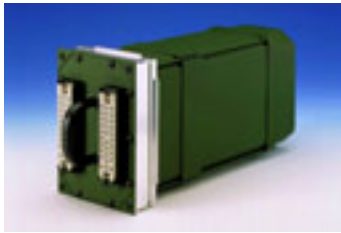
The necessary logistics of just a few sub-modules and the possibility of on-site maintenance reduce the life-time costs and increase the system readiness.

Different possibilities for modules in section C are as listed on the next page. A maximum of 3 cut-outs is possible. Each cut-out has a maximum of 6 modules according to the operational requirements.



* TEMPEST: Temporary Emanation and Spurious Transmission

** MOSAK: Modular Standardized Infeed Unit (Modulares Standard-Anschaltkasten)



Complete module lightning, over-voltage, NEMP protection and EMC filter



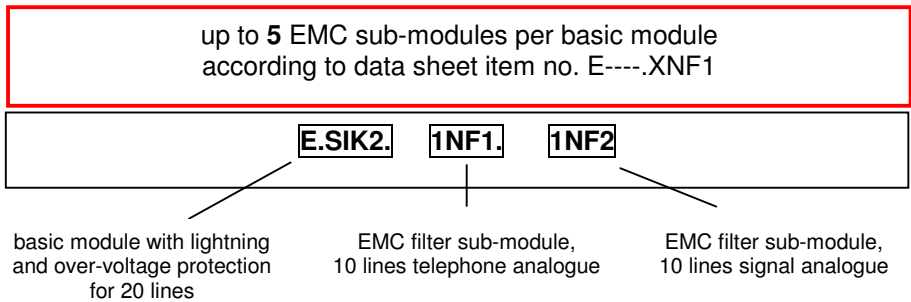
Lightning, over-voltage and NEMP protection module



EMC filter module

As a standard, basic modules are available

- for unshielded lines with a discharge current of 50 kA 10/350 μ s for the total module and
- for shielded lines 0.1 - 4 kA 8/20 μ s depending on the rated voltage per wire!

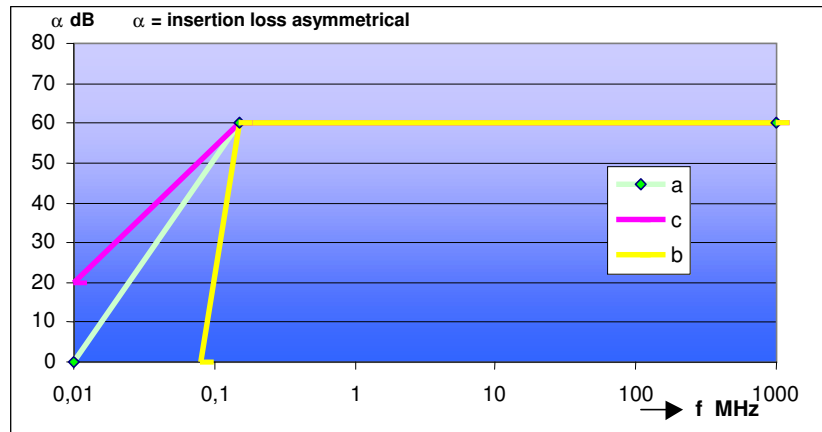
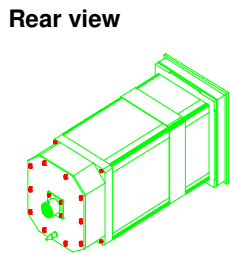
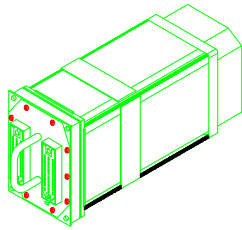
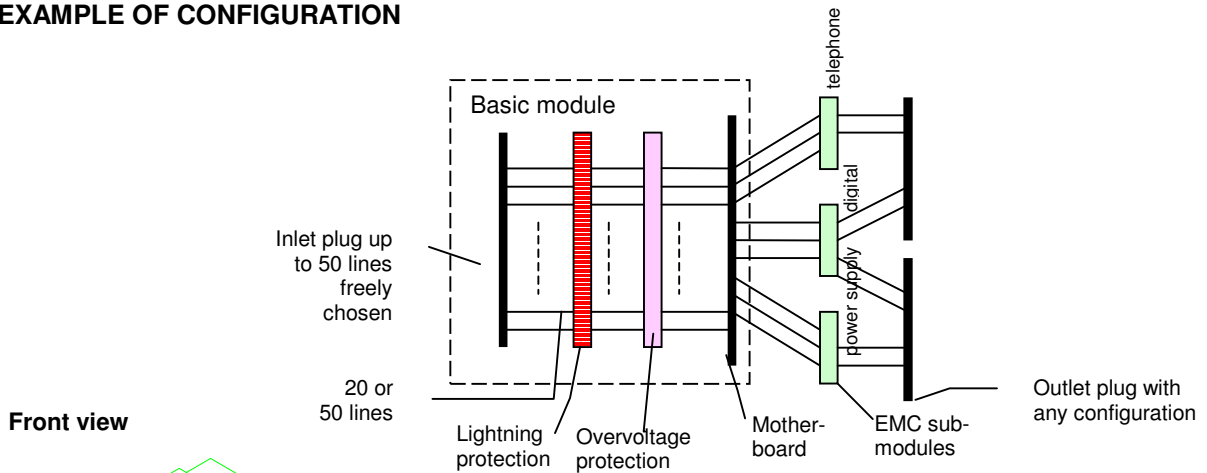


X = number of sub-modules in one basic module

In the basic modules the prices for in and outlet sockets and/or press clamps and motherboard for the corresponding EMC sub-modules are included. The configuration of the plugs can be user defined within the measures of the front plate and the cover on the back. Customised signal modules can be delivered up to a maximum by equipping them with the corresponding EMC sub-modules. A basic module can be equipped with 5 user defined EMC sub-modules. EMC sub-modules with different filter curves, number of lines, power, voltage and adjustments are available as standard.



EXAMPLE OF CONFIGURATION



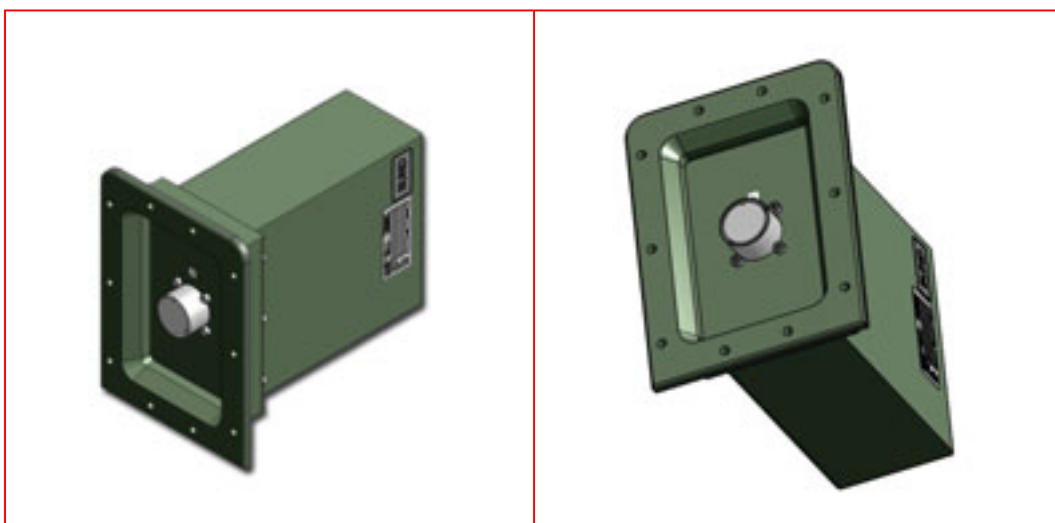
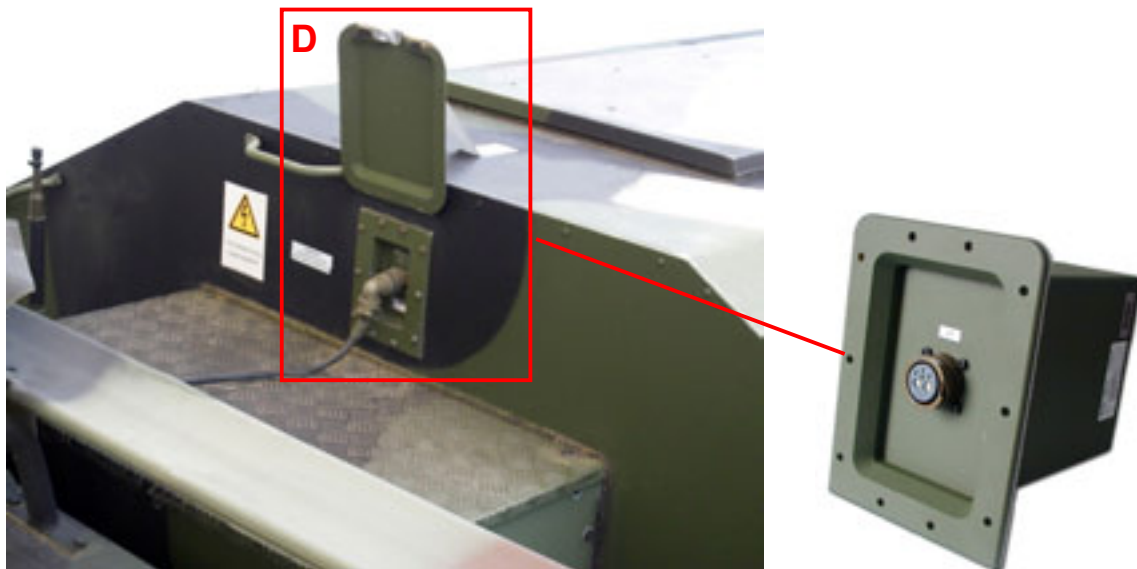
Infeed module T2 / electrical generator (standard size)



D. CHARGE INFEEED MODULE

The charge infeed module (28V / 50A) is intended to lead electricity into shielded working spaces and cabins.

The shielding effectiveness is over 60dB (from 100kHz to 10GHz). The blocking attenuation from 100kHz upwards is over 63dB. It includes a signal line and/or control wire. It also includes an over-voltage protection (LEMP/NEMP^{***}). The charge infeed module is made for temperatures between -35°C and +70°C.



^{***} LEMP/NEMP: Lightning Electromagnetic Pulse/Nuclear Electromagnetic Pulse