



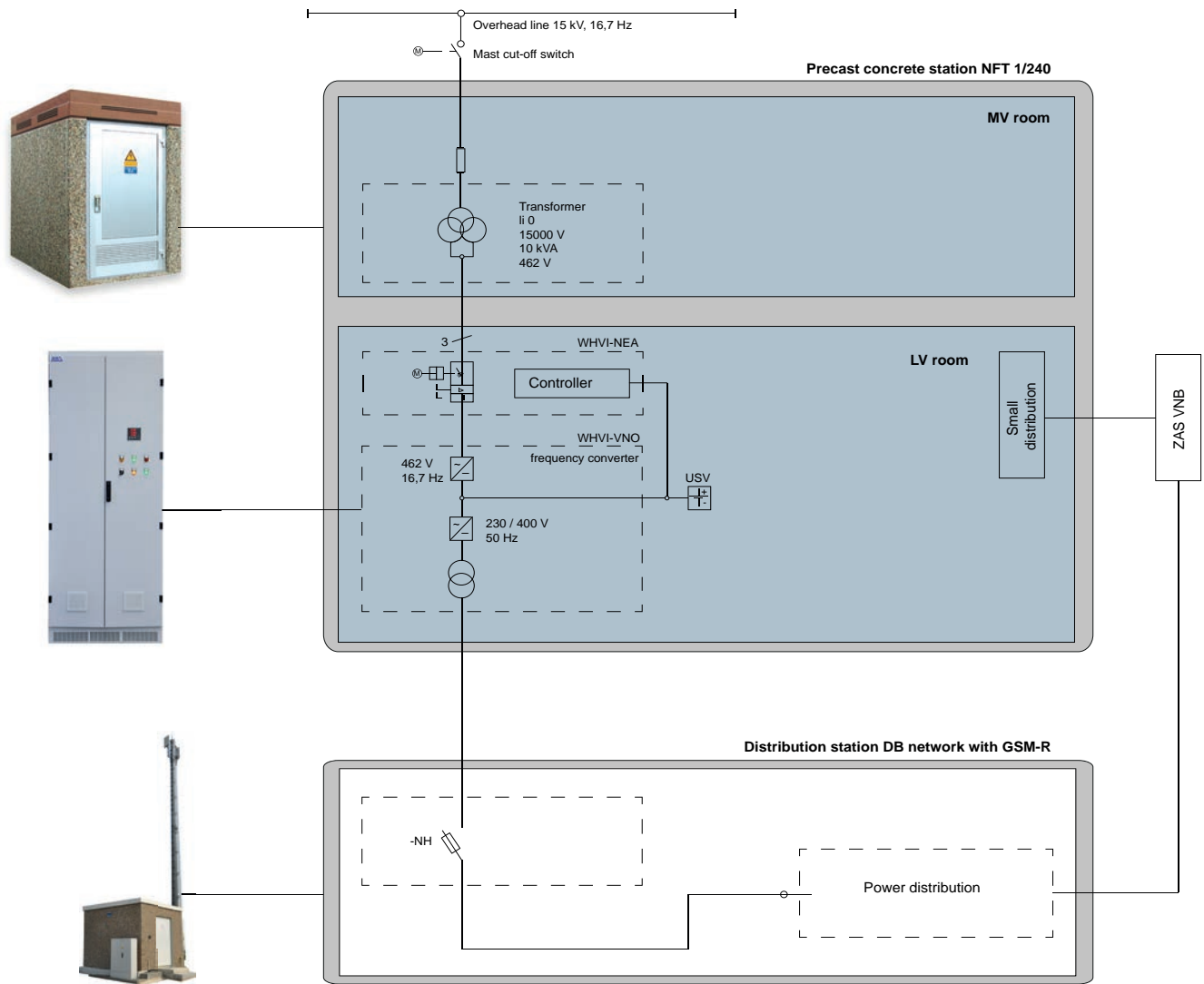
VNO

50 Hz emergency power supply from the overhead line **WHVI®**

Interference-free power supply from the overhead line

There are many electrical consumers along the railway line supplied from the public 50 Hz mains supply. These are often far away from the power supply point of the grid operator. Type VNO emergency power systems can, for example, provide a constant, cost-optimized supply from the 16.7 Hz network of the overhead line to railway radio stations (GSM-R), lifting equipment and other consumers. Consumers that are not in one of the public 50 Hz mains supply regions can therefore be supplied cost-effectively.

The VNO emergency power supply system provides a 230/400 V 50 Hz network with 3 phases at each point of an electrified line and ensures reliable power supply to 50 Hz consumers. A backup battery bridges power supply failures from the overhead line. This allows the controller and other low-load consumers to be supplied continuously.



Emergency power supply overview screen

Our solution

To supply the connected consumers, the precast concrete station for switch heating and emergency power supply systems for IECCs is fitted with a static frequency converter in addition to the existing equipment. The single-phase, oil-filled transformer used to provide these low required powers has a rated output between 10 kVA and 400 kVA and is installed in the MV room. A static converter is used to convert the voltage from 2 x 231 V / 462 V, 16.7 Hz to 3 x 230 V / 400 V, 50 Hz. An uninterruptible power supply (UPS) is installed in addition to the frequency converter. This is necessary to supply the end consumer for a certain period of time, and in particular to keep the control of the plant supplied with energy.

The emergency power supply system (EPS) and associated components

All of the required components can be delivered and assembled as a ready-to-use complete solution, such as:

- railway approved precast concrete station, equipped with small distributor for its own needs, lighting, sockets, internal grounding system
- station accessories such as grounding devices, battery light, spare fuses, set of labels
- single-phase oil transformer
- main distribution EPS with controller, load switching device and overvoltage protection
- frequency converter including Uninterruptible Power Supply VNO
- house connection box (HAK) with NH isolating blade and overvoltage protection

Messages (example)

- frequency converter is in operation
- fault
- frequency converter fault
- fuse fault
- system ready for operation

Features

The converter is used to supply consumers with a voltage of 3 x 230 V / 400 V, 50 Hz from the transformed overhead wire voltage of 2 x 231 V / 462 V, 16.7 Hz. The input voltage (input) is monitored by a voltage-measuring relay and fed rectified to the intermediate circuit of the frequency converter. This frequency converter generates a 50 Hz alternating voltage. This is fed via a sine-wave filter and the output transformer to the output. Input and output are floating and galvanically isolated. This is achieved by an isolation transformer (output transformer) connected after the inverter. The system is designed for continuous operation. The necessary control and display elements are located in the control cabinet door. In the event of a power failure (infeed), the system automatically switches over to battery power. The error messages are signalled by indicator lights and floating contacts and can be read out at the measuring devices in the control cabinet door.



Advantages in the use of emergency power supply systems

- use of approved technology according to TM 4-2015-10384 I.NPS2
- no storage of stationary emergency power units required
- minimization of maintenance and service costs by means of remote monitoring
- high level in the security of supply
- active contribution to environmental protection by reducing CO2 emissions



Example image of a transformer station with emergency power supply system after completion

Technical data (extract)

| | |
|---|--|
| Railway-approved precast concrete station | |
| Dimensions (H x W x D) | project-specific |
| Distribution | HV / LV room |
| Execution | external surface made of washed-out concrete, parapet, roof plate with gravel, aluminium doors, entrance platforms |
| Station accessories | complete as per DIN VDE |
| Single-phase oil transformer | |
| Rated voltages | 15 000 V / 462 V |
| Rated frequency | 16.7 Hz |
| Rated power | 5 kVA to 400 kVA |
| Operating mode | continuous operating (DB) |
| Main Distribution EPS with controller | |
| Rated operating voltage / frequency | 462 V AC / 16.7 Hz |
| Rated operating voltage input | 462 V 16.7 Hz -10%...+20% |
| Rated operating voltage output | 230/400 V 50 Hz |
| Ambient temperature, normal temperature range | -5°C to +35°C |
| Operating temperature max. | -5°C...+55°C |
| Rated current input | project-specific |
| Rated current output | project-specific |
| Maximum power output | 5 kVA to 400 kVA Rated |
| impulse withstand voltage | 2.5 kV |
| Rated insulation voltage | 690 V |
| Electromagnetic compatibility | Radio interference class B |
| Protection class | I, grounded |
| Degree of protection | at least IP 31 according to DIN EN 60529, IEC 529 |
| Installation | indoor installation |
| Dimensions (H x W x D) | project-specific |

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Changes reserved due to technical progress.

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