Instructions for Robust Fiber

Sub-appendix 4.1

Instructions for connecting portable backup generator to a site.

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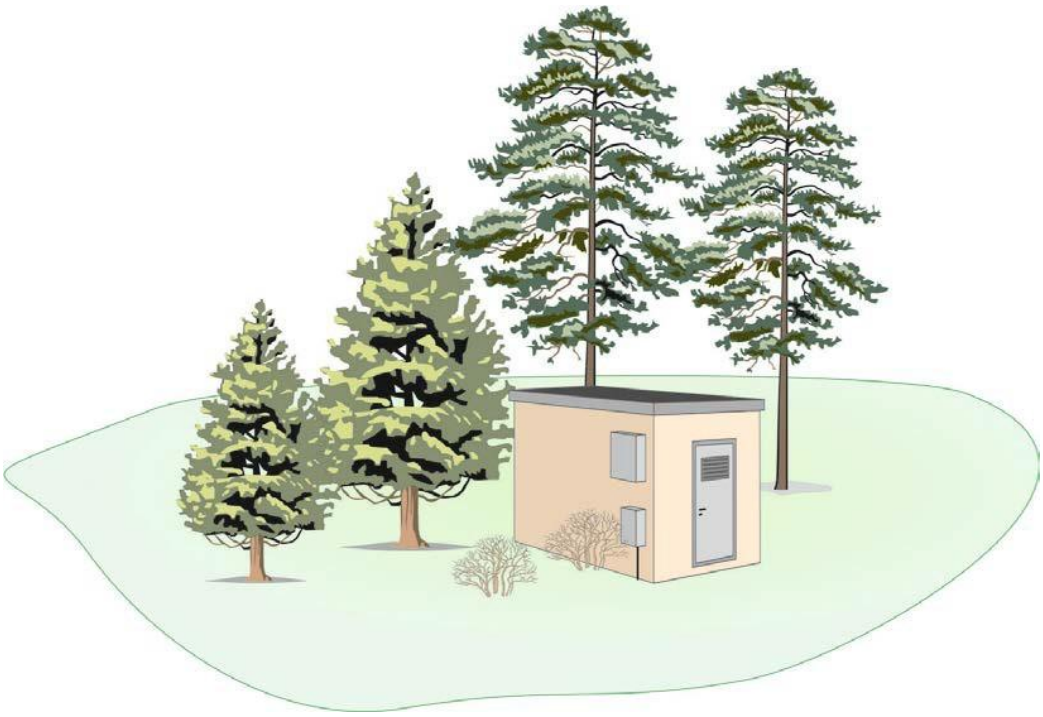

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1. INTRODUCTION

This document provides instructions for connecting portable backup generators, with an operating power of up to 50kVA, to sites in the electronic communications network of a city network.

The instructions are based on the following documents:

- Swedenergy. Technical guidelines for connecting portable backup power generators in customer facilities.
- Swedish Civil Contingencies Agency (MSB). Toolbox for the backup power process

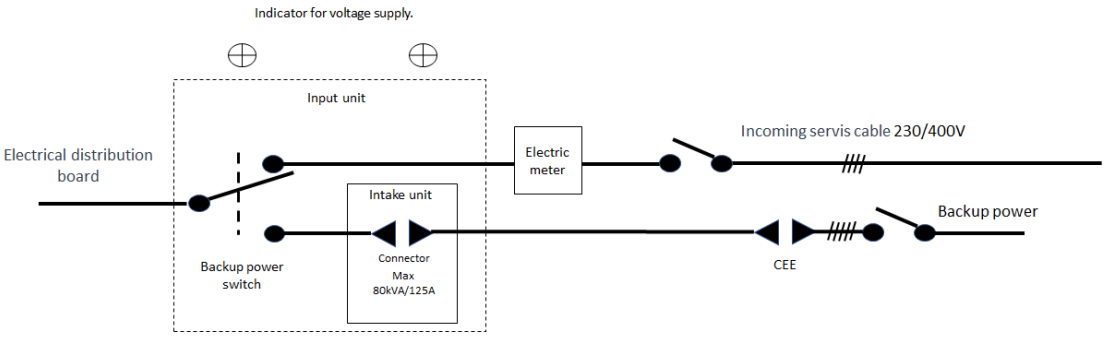
For plants where the portable backup generator is to be connected with a fixed connection, see guidelines from Swedenenergy "Stationary Backup Power Systems - Guidelines for Safe Operation."

2. CONNECTION OF PORTABLE BACKUP GENERATORS

2.1 Generally

The input unit consists of an intake unit for connecting the portable backup generator, a backup power switch for switching the voltage supply between the regular electrical grid and the portable backup generator, as well as an indicator for voltage supply.

The cable for the connection of the portable backup generator shall contain separate neutral conductor (N) and protective conductor (PE).



Picture. Principle of connecting portable backup power in a site.

2.2 Service system

The main rule is that portable generators primarily constitute backup power for a network with TN-C configuration.

2.3 Internal electrical system

The site's internal electrical system should be TN-S.

2.4 Input unit

At the sites that are prepared to be powered from a portable backup power generator, an input unit and a ground terminal are arranged.

An input unit of up to 125 A may have an intake unit for plug connections, such as a CEE intake.

An input unit with a rated current from 63 A should be equipped with a blocked or lockable intake unit, or alternatively, be placed in a lockable enclosure.

The input unit should be placed indoors if the site has an intake for the portable backup power generator supply cable.

If the site does not have an intake for the generator supply cable, the intake unit must be mounted outdoors in a lockable enclosure.

The input unit should be designed in such a way that output to the grid owner's network cannot occur from the portable backup power generator.

The input unit must be approved by the network owner.

The intake pins must not be able to become live with the network connected. This requirement can be met through a reliable backup power switch or by equipping the input unit with a safety switch that meets the requirements according to the current standard SS 428 06 05.

The portable backup power generator shall not be equipped with residual current devices for outgoing backup power supply.

2.5 Protective grounding

To ensure that the installation is grounded even in the event of a disruption in the PEN conductor from the network owner's network, a separate ground terminal should be arranged in accordance with the high voltage regulations. The ground terminal should be connected to the facility's main grounding terminal.

At facilities that lack a main grounding terminal, connection should be made to the PE (PEN) conductor at the input unit or central where the portable backup power is to be input.

For control measurement, a sturdy screw clamp should be inserted in the ground terminal conductor, with which the ground terminal can be disconnected.

The screw clamp should be placed outdoors at the ground terminal. See the high voltage regulations.

Between any screw clamp and the PE busbar in the panel (main grounding terminal), the ground terminal conductor should consist of basic insulated single conductor.

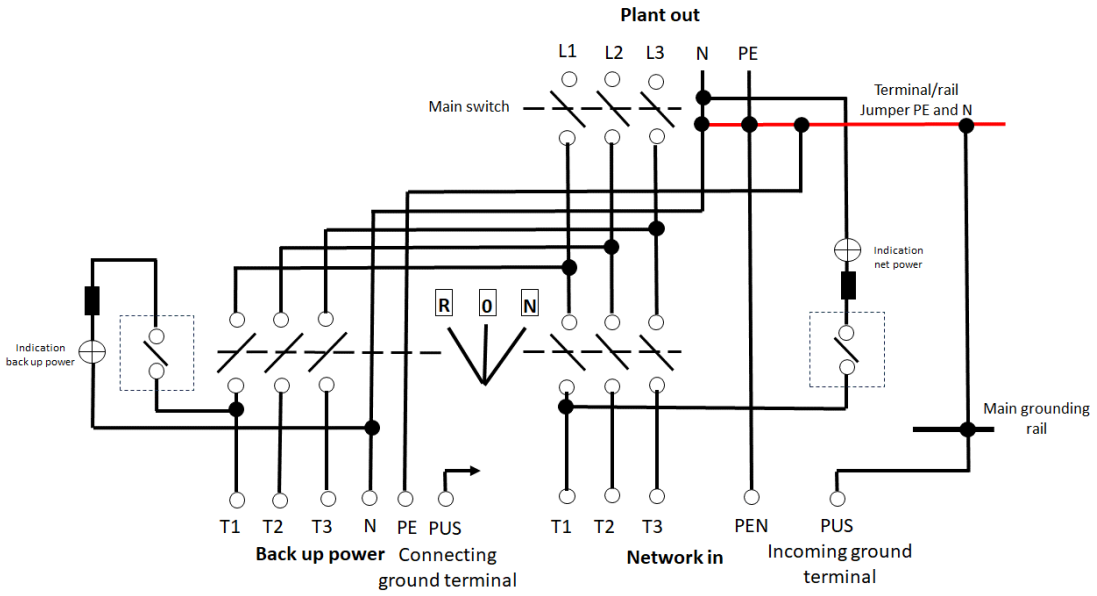
2.6 Connections

Depending on the grounding system (TN-C or TN-S) used by the distribution network of the electricity network owner, the connection of connectors and backup power switches shall be carried out according to the wiring diagrams below.
From a safety point of view for both person and equipment, TN-C systems are preferred from the electricity network owner. The connection of connection devices and backup power switches is shown in a simplified way in the wiring diagram below.

Grounding system TN-C

The neutral conductor and protective conductor from the portable backup power plant should be connected to the network owner's network in the fixed installation.

To avoid damage to equipment or, in the worst case, personal injury, the phase sequence should always be checked with a phase sequence meter / outlet tester before connecting.



Picture. Wiring diagram for connecting a portable backup power to site at distribution system TN-C

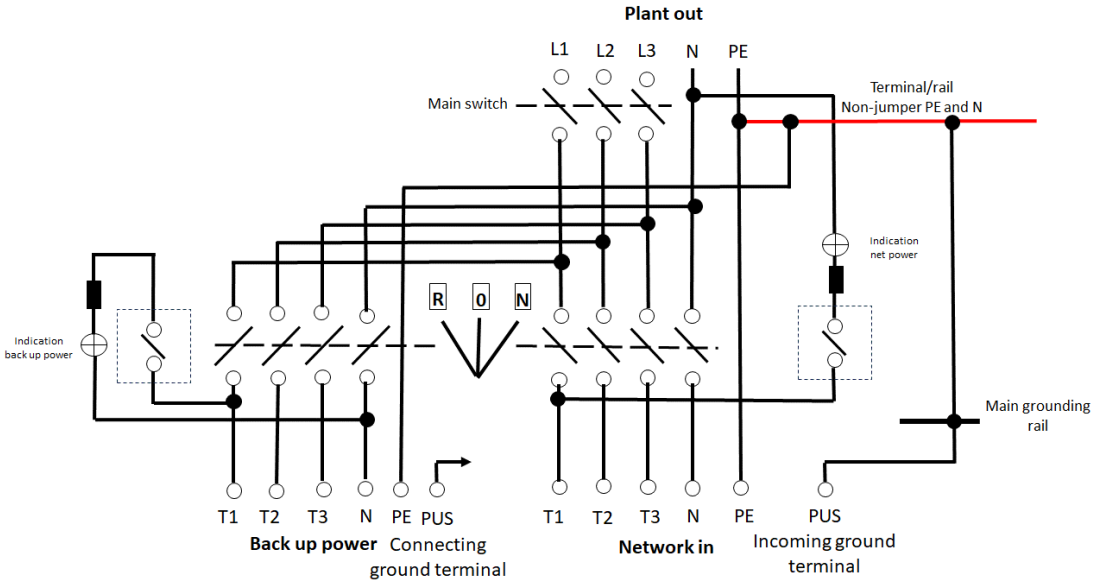
Grounding system TN-S

In the case of TN-S, the incoming neutral conductor should be broken when switching to backup power.

To avoid damage to equipment or, in the worst case, personal injury, the phase sequence should always be checked with a phase sequence meter / outlet tester before connecting.

Note:
At TN-S, in the event of incorrect handling of the system or damaged/unearthed service, significant potential differences can occur on the neutral conductor with an increased risk of damage / fire in equipment and personal injury.

To prevent damage to TN-S, follow the manufacturer's instructions on protective ground on all equipment and connect stands and cable trays to ground.



Picture. Wiring diagram for connecting a portable backup power to site at distribution system TN-S

3. LABELING

The input unit for portable backup generator shall be marked in a clear and uniform manner.

The input unit with backup power switch for plug-connected backup power generators should be equipped with a sign displaying the following text:

"WARNING: This input unit is for portable backup power generators only. Do not connect to the main power supply. Disconnect the main power supply before connecting the portable backup power generator."

Input unit for portable backup power generator

The minimum rated power for the backup power generator is ……. kVA.

The intake unit may be connected or separated only when the portable backup generator is not operational.

Notice! Disconnect unprioritized load before the portable backup generator is put into operation.

A sign displaying the rated data of the portable backup power generator should be placed in a location where it can be easily read when the generator is in operation.