



Control Gear HZP for Connecting HVR Power Supply Units of the 2nd Generation

Applications

DOK-POWER*-HZP*****G2-ANW1-EN-P

Title	Control Gear HZP for connecting HVR power supply units of the second generation
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The purpose of the document	<p>This document</p> <ul style="list-style-type: none"> • helps in selecting HZP modules • assists in constructing the control cabinet • helps when connecting HZP modules

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Notes

1 Safety Instructions for Electrical Drives

1.1 Introduction

These instructions must be read and understood before the equipment is used to minimize the risk of personal injury and / or property damage. Follow these safety instructions at all times.

Do not attempt to install, use or service this equipment without first reading all documentation provided with the product. Please read and understand these safety instructions, and all user documentation of the equipment, prior to working with the equipment at any time. You must contact your local Indramat representative if you cannot locate the user documentation for your equipment. A listing of Indramat offices is supplied in the back of this manual. Request that your representative send this documentation immediately to the person or persons responsible for the safe operation of this equipment.

If the product is resold, rented and/or otherwise transferred or passed on to others, then these safety instructions must accompany it.



WARNING

Improper use of this equipment, failure to follow the attached safety instructions, or tampering with the product, including disabling of safety devices, may result in bodily injury, severe electrical shock or death and property damage!

1.2 Hazards due to improper use



DANGER

High voltage and high discharge current!

Danger to life, risk of severe electrical shock and risk of injury!



DANGER

Dangerous movements!

Danger to life and risk of injury or equipment damage by unintentional motor movements!



WARNING

High electrical voltages due to incorrect connections!

Danger to life, severe electrical shock and serious bodily injury!



WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!



CAUTION

**Surface of machine housing could be extremely hot!
Danger of injury! Danger of burns!**



CAUTION

Risk of injury due to incorrect handling!

Bodily injury caused by crushing, shearing, cutting and thrusting movements!



CAUTION

Risk of injury due to incorrect handling of batteries!

1.3 General

- INDRAMAT GmbH is not liable for damages resulting from failure to observe the warnings given in these instructions.
- Operating, maintenance and safety instructions in English must be ordered and received before initial start-up, if the instructions in the language provided are not understood perfectly.
- Proper and correct transport, storage, assembly, and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Trained and qualified personnel in electrical equipment:

Only trained and qualified personnel may work on this equipment or within its proximity. Personnel are qualified if they have sufficient knowledge of the assembly, installation, and operation of the product as well as an understanding of all warnings and precautionary measures noted in these instructions.

Furthermore, they should be trained, instructed, and qualified to switch electrical circuits and equipment on and off, to ground them, and to mark them according to the requirements of safe work practices and common sense. They must have adequate safety equipment and be trained in first aid.

- Use only spare parts approved by the manufacturer.
- All safety regulations and requirements for the specific application must be followed as practiced in the country of use.
- The equipment is designed for installation on commercial machinery.
- Start-up is only permitted once it is sure that the machine in which the product is installed complies with the requirements of national safety regulations and safety specifications of the application.

European countries: see Directive 89/392/EEC (Machine Guideline).

- Operation is only permitted if the national EMC regulations for the application are met.

The instructions for installation in accordance with EMC requirements can be found in the INDRAMAT document "EMC in Drive and Control Systems".

The machine builder is responsible for compliance with the limiting values as prescribed in the national regulations and specific EMC regulations for the application.

European countries: see Directive 89/336/EEC (EMC Guideline).

U.S.A.: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA), and local building codes. The user of this equipment must consult the above noted items at all times.

- Technical data, connections, and operational conditions are specified in the product documentation and must be followed.

1.4 Protection against contact with electrical parts and not grounded enclosures

Note: This section pertains to equipment and drive components with voltages over 50 Volts.

Touching live parts with potentials of 50 volts and higher applied to them or touching not grounded enclosures can be dangerous and cause severe electrical shock. In order for electrical equipment to be operated, certain parts must have dangerous voltages applied to them.



High Voltage!

Danger to life, severe electrical shock and risk of injury!

- ⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain and / or repair this equipment.
 - ⇒ Follow general construction and safety regulations when working on electrical installations.
 - ⇒ Before switching on power, the ground wire must be permanently connected to all electrical units according to the connection diagram.
 - ⇒ At no time may electrical equipment be operated if the ground wire is not permanently connected, even for brief measurements or tests.
 - ⇒ Before beginning any work, disconnect mains or the voltage source from the equipment. Lock the equipment against being switched on while work is being performed.
 - ⇒ Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning work. Measure the voltage on the capacitors before beginning work to make sure that the equipment is safe to touch.
 - ⇒ Never touch the electrical connection points of a component while power is turned on.
 - ⇒ Before switching the equipment on, install those covers and guards provided with the equipment to prevent contact with live parts. Before operating, cover and guard live parts properly so they cannot be touched.
 - ⇒ A residual-current-operated protective device (r.c.d.) must not be used on an AC drive! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.
European countries: according to EN 50178/ 1994.
 - ⇒ Electrical components with exposed live parts must be installed in a control cabinet to prevent direct contact.
European countries: according to EN 50178/ 1994.
U.S.A: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA), and local building codes. The user of this equipment must consult the above noted items at all times.
-

**DANGER****High housing voltage! High leakage current!**

Danger to life and limb, danger of injury from electric shock!

- ⇒ Prior to powering up, connect the electrical equipment, the housing of all electrical units and motors to the protective conductor at the grounding points or ground them. This applies even to brief tests.
- ⇒ The protective conductor of the electrical equipment and units must always be connected to the supply network. Leakage current exceeds 3.5 mA.
- ⇒ Use at least a 10 mm² copper conductor cross section for this protective connection over its entire course!
- ⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. High voltage levels can occur on the housing that could lead to severe electrical shock and personal injury.

European countries: EN 50178 / 1994, section 5.3.2.3.

USA: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA), and local building codes. The user of this equipment must consult the above noted items at all times.

1.5 Protection by protective low voltage (PELV) against electrical shock

All connections and terminals with voltages ranging between 5 and 50 volts on INDRAMAT products are protective low voltages designed in accordance with the following standards on contact safety:

- International: IEC 364-4-411.1.5
- EU countries: see EN 50178/1994, section 5.2.8.1.

**WARNING****High electrical voltages due to incorrect connections!**

Danger to life, severe electrical shock and/or serious bodily injury!

- ⇒ Only that equipment or those electrical components and cables may be connected to all terminals and clamps with 0 to 50 volts that are of the protective low voltage type (PELV = Protective Extra Low Voltage).
- ⇒ Only connect those voltages and electrical circuits that are safely isolated. Safe isolation is achieved, for example, with an isolating transformer, an optoelectronic coupler or when battery-operated.

1.6 Protection against dangerous movements

Dangerous movements can be caused when units have bad interfaces or motors are connected incorrectly.

There are various causes of dangerous movements:

- Improper or incorrect wiring or cable connections
- equipment is operated incorrectly
- probe parameters or encoder parameters are set incorrectly
- malfunctioning components
- errors in software or firmware

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

Although the monitoring circuits in the drive components make improper operation almost impossible, personnel safety requires that proper safety precautions be taken to minimize the risk of personal injury and/or property damage. This means that unexpected motion must be anticipated since safety monitoring built into the equipment might be defeated by incorrect wiring or other faults.



DANGER

Dangerous movements!

Danger to life and risk of injury or equipment damage!

- ⇒ In the drive component monitoring units, every effort is made to avoid the possibility of faulty operation in connected drives. Unintended machine motion or other malfunction is possible if monitoring units are disabled, bypassed or not activated.
- ⇒ Safe requirements of each individual drive application must be considered on a case-by-case basis by users and machine builders.

Avoiding accidents, personal injury and/or property damage:

- ⇒ Keep free and clear of the machine's range of motion and moving parts. Prevent people from accidentally entering the machine's range of movement:
 - use protective fences
 - use protective railings
 - install protective coverings
 - install light curtains / barriers
- ⇒ Fences should be strong enough to withstand maximum possible momentum.
- ⇒ Mount the Emergency Stop (E-stop) switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Do not operate the machine if it is not working.
- ⇒ Isolate the drive power connection by means of an emergency stop circuit or use a start inhibit system to prevent unintentional start-up.

- ⇒ Make sure that the drives are brought to standstill before accessing or entering the danger zone.
 - ⇒ Disconnect electrical power to the equipment using a master lock-out and secure against reconnection for:
 - maintenance and repair work
 - cleaning of equipment
 - long periods of discontinued equipment use
 - ⇒ Avoid operating high-frequency, remote control, and radio equipment near equipment electronics and supply leads. If use of such equipment cannot be avoided, verify the system and the plant for possible malfunctions at all possible positions of normal use before the first start-up. If necessary, perform a special Electromagnetic Compatibility (EMC) test on the plant.
-

1.7 Protection against magnetic and electromagnetic fields during operations and mounting

Magnetic and electromagnetic fields in the vicinity of current-carrying conductors and permanent motor magnets represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.



Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

- ⇒ Persons with pacemakers and metal implants are not permitted to have access to the following areas:
 - Areas in which electrical equipment and parts are mounted, being operated or started up.
 - Areas in which parts of motors with permanent magnets are being stored, repaired or mounted.
 - ⇒ If it is necessary for a person with a pacemaker to enter into such an area, then a physician must be consulted prior to doing so.
 - ⇒ Persons with metal implants or hearing aids must take care prior to entering into areas described above. It is assumed that metal implants or hearing aids will be affected by such areas: A physician must be consulted prior to working in and/or entering such areas.
-

1.8 Protection against contact with hot parts



CAUTION

**Surface of machine housing could be extremely hot!
Danger of injury! Danger of burns!**

- ⇒ Do not touch housing surface near the source of heat!
Danger of burns!
- ⇒ Prior to accessing a unit, wait ten (10) minutes to allow the unit to cool off.
- ⇒ If hot parts of the equipment are touched, such as the unit housing in which heatsink and resistor are located, then this can cause burns.

1.9 Protection during handling and installation

All INDRAMAT products should be handled and assembled according to the instructions in the documentation.



CAUTION

Risk of injury due to incorrect handling!

Bodily injury caused by crushing, shearing, cutting, and thrusting movements!

- ⇒ Observe installation instructions and safety regulations before handling and working on the product.
- ⇒ Use suitable lifting or moving equipment during installation. Refer to the user manual for the product.
- ⇒ Take precautions to avoid pinching and crushing.
- ⇒ Only use suitable tools specified in the user manuals and use them according to the instructions.
- ⇒ Use lifting devices and tools correctly and safely.
- ⇒ Wear appropriate protective clothing, e.g., protective goggles, safety shoes, protective gloves.
- ⇒ Never stand under suspended loads.
- ⇒ Clean up liquids from the floor to prevent personnel from slipping.

1.10 Battery safety

Batteries contain reactive chemicals. Incorrect handling can result in injury or equipment damage.



CAUTION

Risk of injury due to incorrect handling!

- ⇒ Do not attempt to reactivate dead batteries by heating or other methods (danger of explosion and corrosion).
 - ⇒ Never charge batteries (danger from leakage and explosion).
 - ⇒ Never throw batteries into a fire.
 - ⇒ Do not take batteries apart.
 - ⇒ Handle carefully. Incorrect extraction or installation of a battery can damage equipment.
-

Note: Environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (Danger of explosion). Dispose of batteries separately from other refuse. Observe the legal requirements in the country of installation.

Notes

2 Electrical Connections

2.1 The Power Supply Connections of the HZP Units

HZP units are control gears intended for use in the power supply connections of regenerative power supply modules of the types "HVR02.2-25" (HZP02.2-W025N) and "HVR03.2-45" (HZP03.2-W045N).

These units contain the commutation choke, the radio interference suppression capacitors and the mains filter (NFD02.x). Any other components are only then needed if the mains connections utilize a transformer.

Direct power supply connection

The HZP units are placed between the HVR power connections and the power supply connections.

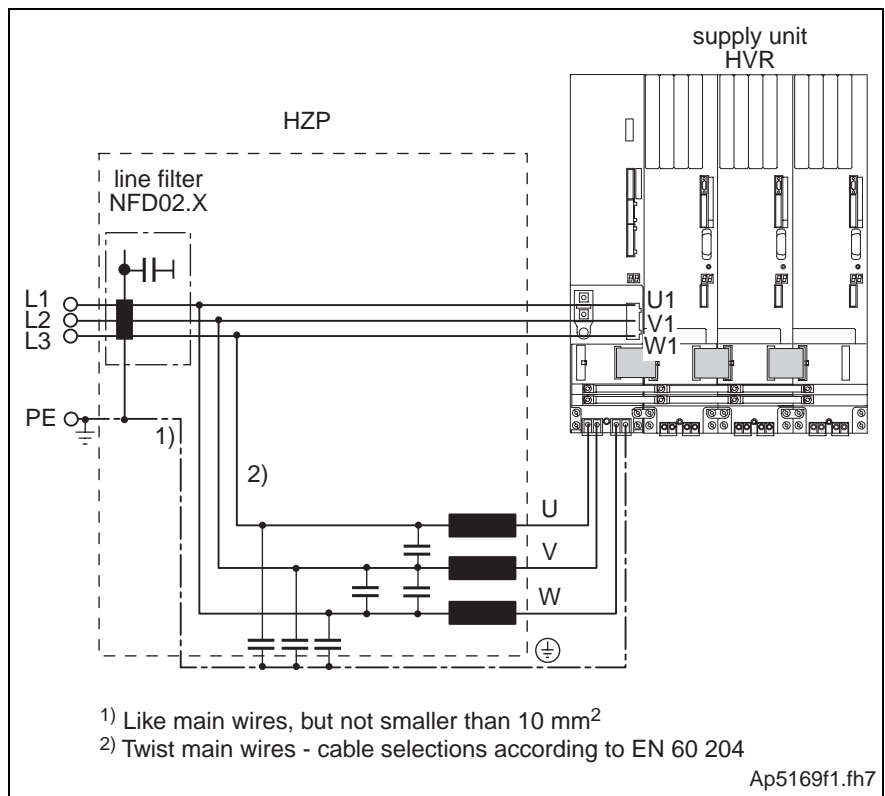


Fig. 2-1: Direct power supply connection of the HVR using an HZP control gear

Power supply connection via a transformer (with mains voltage < 3 * AC 380V bzw. > 3 * 480V)

Based on the given technical conditions, it is necessary to place a current-compensating choke between the power supply module and the HZP if the power supply connection is connected upstream of a transformer. Two capacitors are additionally needed (470nF) that are switched L+ and L- to ground. These are needed to avoid an excessive heat loss and overvoltage of the transformer. They are available as two accessory kits ("SUP - E03 - HVR" and "SUP - E04-HVR").

The components that belong to each other are illustrated in table 2-3.

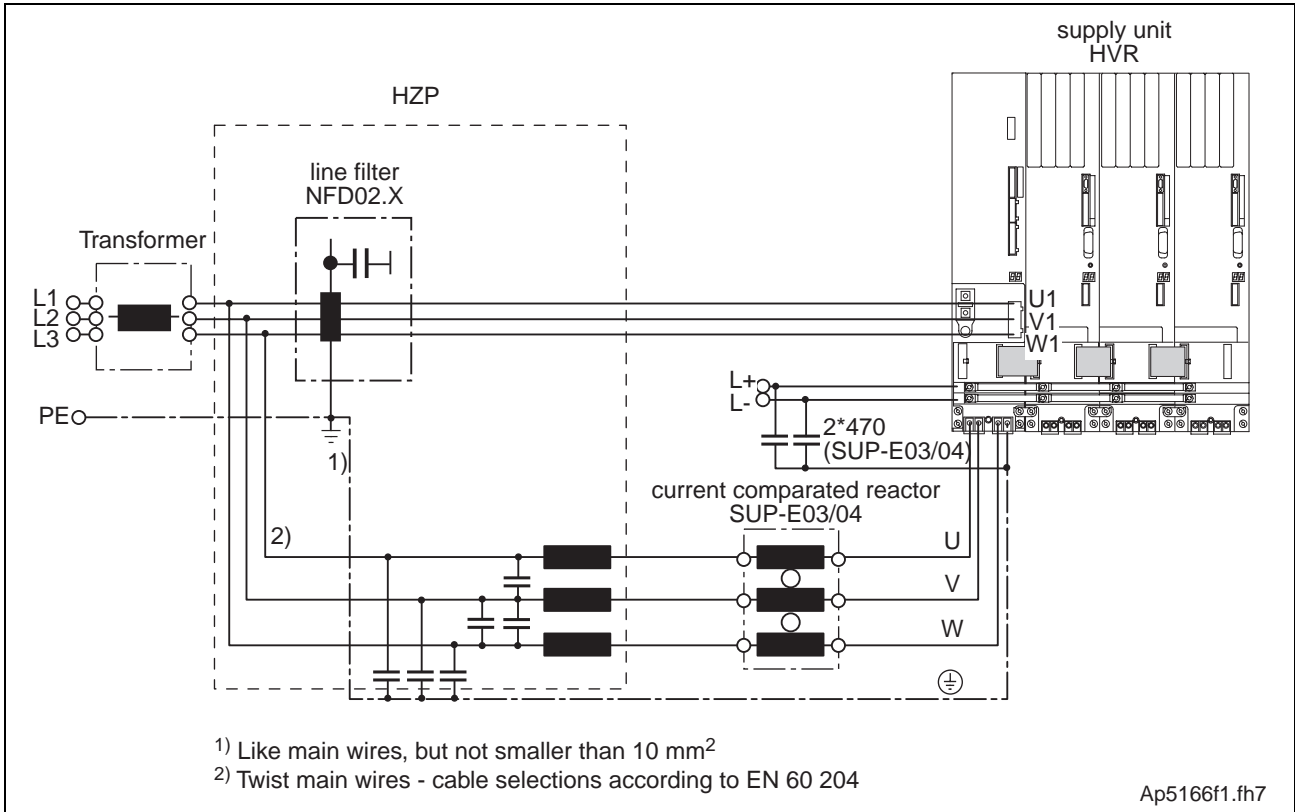


Fig. 2-2: Connection via transformer using accessory kit (E03 or E04)

Power supply module	Control gears	Matching accessory kit
HVR02.2 - 25	HZP02.2 - W025N	SUP - E03 - HVR
HVR03.2 - 45	HZP03.2 - W045N	SUP - E04 - HVR

Fig. 2-3: Selection table

2.2 Dimensional Sheets

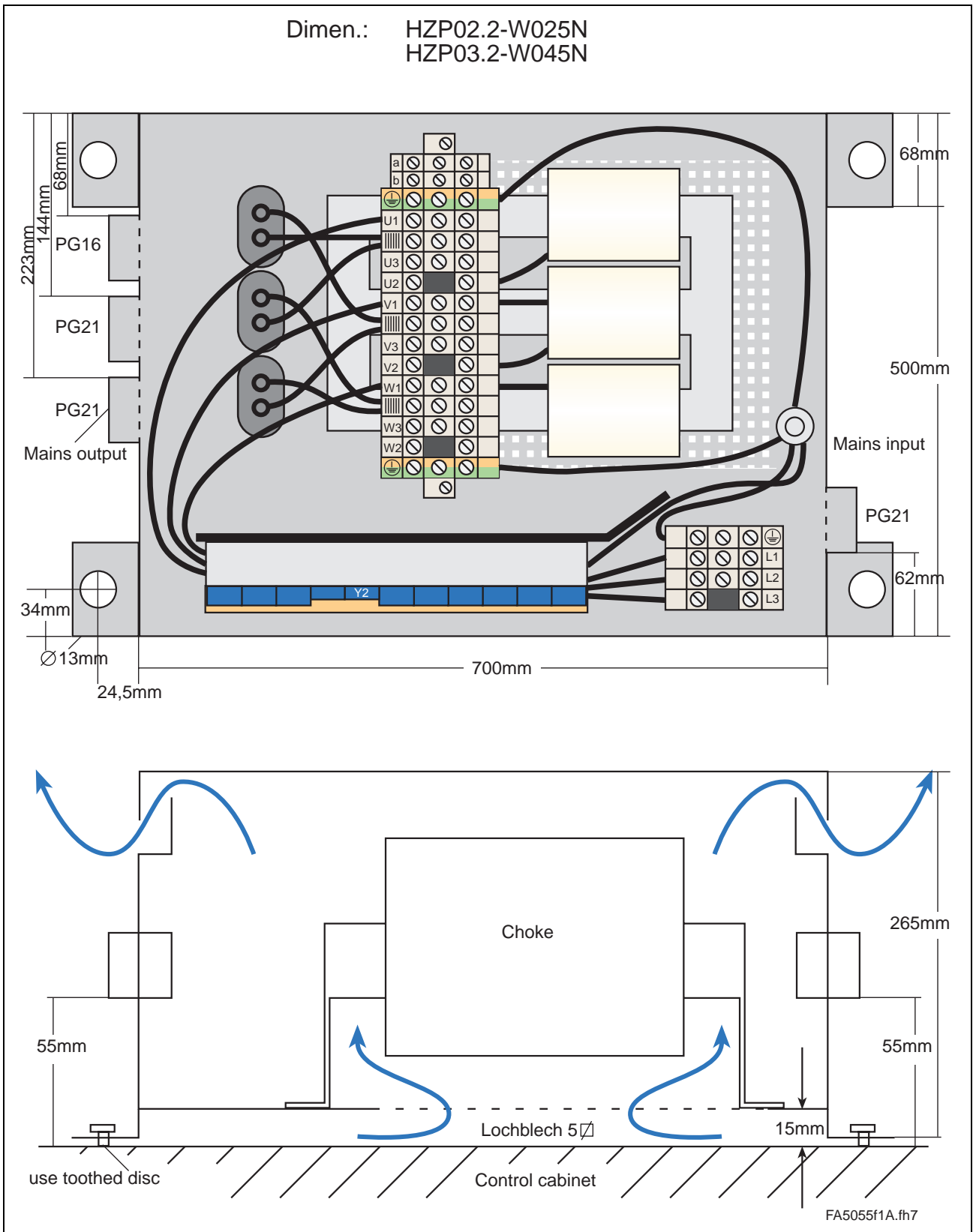


Fig. 2-4: Dimensional sheet for HZP02.2 / HZP03.2

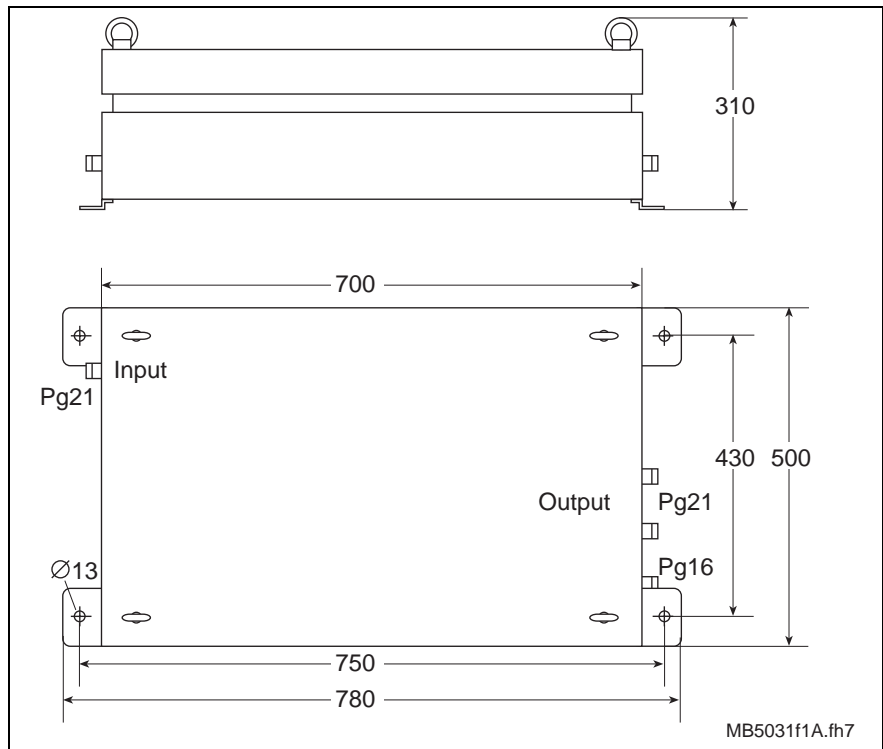


Fig. 2-5: Power supply module type: HZP02.2-W0 25N, TN 278950, BV 31157, 25kW, 45A, weight: 52kg

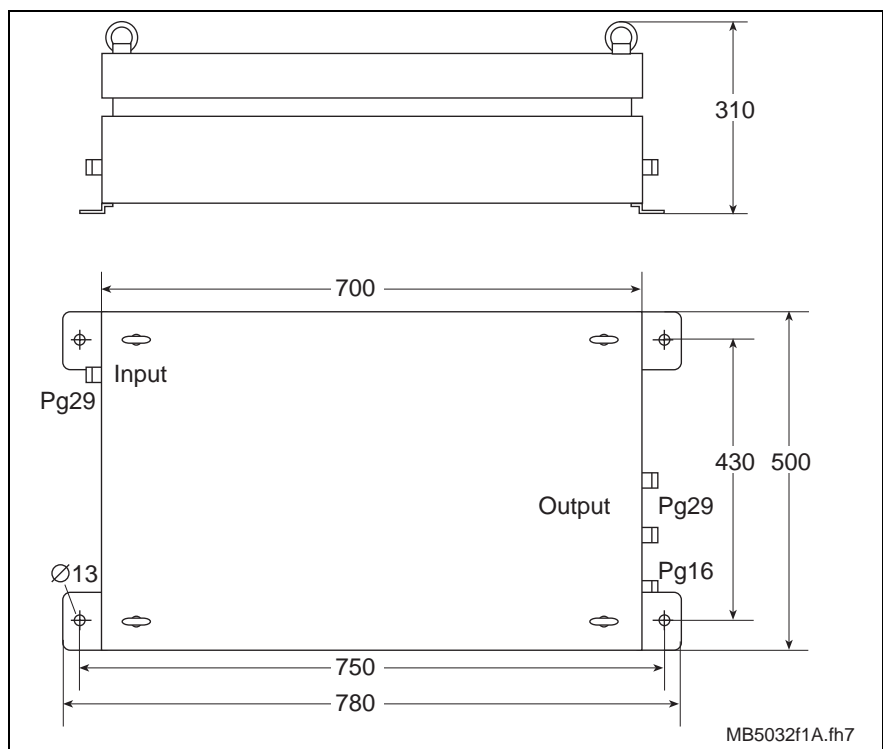


Fig. 2-6: Power supply module type: HZP03.2-W0 45N, TN 278949, BV 31107, 45kW, 80A, weight: 72kg

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