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1 Introduction

This technical file contains detailed descriptions on the safe and proper installation, connection, commissioning and monitoring of the product.

It also includes safety instructions and general information about the product.

This technical file is intended solely for specially trained and authorized personnel.

1.1 Manufacturer

The product is manufactured by:

Reinhausen Manufacturing Inc.

2549 North 9th Avenue
Humboldt, Tennessee 38343, USA
Tel.: (+1) 731/784-7681
Fax: (+1) 731/784-7682
E-mail: sales@us.reinhausen.com

Further information on the product and copies of this technical file are available from the address listed above or at www.tapcon250.com.

1.2 Subject to change without notice

The information contained in this technical file comprises the technical specifications approved at the time of printing. Significant modifications will be included in a new edition of the technical file.

The document number and version number of this technical file are shown in the footer.

1.3 Completeness

This technical file is incomplete without the supporting documentation.

1.4 Supporting documents

The following documents apply to this product:

- Operating instructions
- Connection diagrams

Also observe generally valid legislation, standards, guidelines and specifications on accident prevention and environmental protection in the respective country of use.
1 Introduction

1.5 Safekeeping

This technical file and all supporting documents must be kept ready at hand and accessible for future use at all times.
2 Safety

2.1 General safety information

The technical file contains detailed descriptions on the safe and proper installation, connection, commissioning and monitoring of the product.

- Read this technical file through carefully to familiarize yourself with the product.
- Particular attention should be paid to the information given in this chapter.

2.2 Appropriate use

The product and associated equipment and special tools supplied with it comply with the relevant legislation, regulations and standards, particularly health and safety requirements, applicable at the time of delivery.

If used as intended and in compliance with the specified requirements and conditions in this technical file as well as the warning notices in this technical file and attached to the product, then the product does not present any hazards to people, property or the environment. This applies throughout the product's entire life, from delivery through installation and operation to disassembly and disposal.

The operational quality assurance system ensures a consistently high quality standard, particularly in regard to the observance of health and safety requirements.

The following is considered appropriate use

- The product must be operated in accordance with this technical file and the agreed delivery conditions and technical data
- The equipment and special tools supplied must be used solely for the intended purpose and in accordance with the specifications of this technical file

2.3 Inappropriate use

Use is considered to be inappropriate if the product is used other than as described in the Appropriate use section. Please also note the following:

- Risk of explosion and fire from highly flammable or explosive gases, vapors, or dusts. Do not operate product in areas at risk of explosion.
- Unauthorized or inappropriate changes to the product may lead to personal injury, material damage, and operational faults. Only modify product following discussion with Maschinenfabrik Reinhausen GmbH.
2 Safety

2.4 Personnel qualification

The product is designed solely for use in electrical energy systems and facilities operated by appropriately trained staff. This staff comprises people who are familiar with the installation, assembly, commissioning and operation of such products.

2.5 Operator's duty of care

To prevent accidents, disruptions and damage as well as unacceptable adverse effects on the environment, those responsible for transport, installation, operation, maintenance and disposal of the product or parts of the product must ensure the following:

- All warning and hazard notices are complied with.
- Personnel are instructed regularly in all relevant aspects of operational safety, the operating instructions and particularly the safety instructions contained therein.
- Regulations and operating instructions for safe working as well as the relevant instructions for staff procedures in the case of accidents and fires are kept on hand at all times and are displayed in the workplace where applicable.
- The product is only used when in a sound operational condition and safety equipment in particular is checked regularly for operational reliability.
- Only replacement parts, lubricants and auxiliary materials which are authorized by the manufacturer are used.
- The specified operating conditions and requirements of the installation location are complied with.
- All necessary devices and personal protective equipment for the specific activity are made available.
- The prescribed maintenance intervals and the relevant regulations are complied with.
- Installation, electrical connection and commissioning of the product may only be carried out by qualified and trained personnel in accordance with this technical file.
- The operator must ensure appropriate use of the product.
3 Product description

The TC250-67 adapter panel allows installation of the TAPCON® 250 in a cutout with dimensions of 5-7/8" x 15-1/8" (162 x 419 mm). This makes it possible to use a TAPCON® 250 to replace existing voltage regulators of the following types:

▪ Westinghouse SVC
▪ Westinghouse SVR
▪ Beckwith M-0067E
▪ Beckwith M-2067B

All required connections are present on the back of the adapter panel in the form of a terminal block. The adapter panel contains a replaceable fuse. A spare fuse can be found in the fuse holder.

⚠️ WARNING

Fire hazard

Risk of fatal injury and damage to the device and system peripherals due to the use of incorrect fuses.

► Only use fuses of the following type: Article number 312.300, manufactured by LITTLEFUSE, 250 V AC/0.3 A.
4 Mounting

This chapter describes how to correctly mount and connect the device. Note the connection diagrams provided.

**WARNING**

**Electric shock**
Risk of fatal injury due to electrical voltage.

- De-energize the device and system peripherals and lock them to prevent them from being switched back on.
- Do so by short-circuiting the current transformer; do not idle the current transformer.

**NOTICE**

**Electrostatic discharge**
Damage to the device due to electrostatic discharge.

- Take precautionary measures to prevent the build-up of electrostatic charges on work surfaces and personnel.

### 4.1 Installing the adapter panel

Proceed as follows to assemble the TAPCON® 250 voltage regulator with the TC250-67 adapter panel:

1. Fasten the voltage regulator on the rear side of the adapter panel using the 4 screws provided.
2. Insert both plug terminals into connection P2 on the bottom of the voltage regulator.
3. Install the adapter panel with voltage regulator into a control cabinet or appropriate mounting point.

☞ The adapter panel has been installed.

### 4.2 Cable recommendation

Please note the following recommendation from Maschinenfabrik Reinhausen when wiring the device.

Excessive line capacitance can prevent the relay contacts from breaking the contact current. In control circuits operated with alternating current, take into account the effect of the line capacitance of long control lines on the function of the relay contacts.

<table>
<thead>
<tr>
<th>Conductor cross-section</th>
<th>16...22 AWG (0.33...1.3 mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastening</td>
<td>Cable shoe (e.g. TYCO/AMP 36150)</td>
</tr>
<tr>
<td>Max. permissible torque</td>
<td>9.0 lb·in (1.1 Nm)</td>
</tr>
</tbody>
</table>

Table 1: Cable recommendation
4.3 Electromagnetic compatibility

The device has been developed in accordance with applicable EMC standards. The following points must be noted in order to maintain the EMC standards.

- Ground the TAPCON® 250 using the grounding screw on the housing.
- Route signal lines in a shielded cable.
- Follow the notes in the associated operating instructions regarding the connection of the TAPCON® 250.

4.4 Connecting the adapter panel

**WARNING**

Electric shock

Risk of fatal injury due to connection mistakes

- Ground the device using the grounding screw on the housing.
- Pay attention to the phase difference of the secondary terminals for the current transformer and voltage transformer.
- Connect the output relays correctly to the motor-drive unit.
Proceed as follows to connect the adapter panel:

- Connect the adapter panel with mounted TAPCON® 250 in accordance with the following connection diagram and in accordance with the associated motor-drive unit.

Figure 1: Connecting the adapter panel
Motor voltage can be either 120 V or 240 V from phase to neutral conductor or 240 V from phase to phase.

The neutral conductor for the current transformer and voltage transformer must be grounded outside the voltage regulator.

We recommend connecting the NEUTRAL (TB1.3) and the neutral conductor for the motor.

Supplying the device using auxiliary voltage

Alternatively, you can supply the TAPCON® 250 via an auxiliary voltage source (12 V DC, 1 A) to ensure operation even when the transformer is switched off. Follow the notes in this regard in the associated operating instructions for the TAPCON® 250.
Connection TB1.1, voltage input

Input for voltage measurement and supplying the TAPCON® 250. Permissible voltage range of 85...140 V AC. The power consumption of the TAPCON® 250 is 6...12 VA (depending on the product version). The voltage is in reference to the neutral conductor (TB1.3).

Connection TB1.2, load current (return conductor)

Connection for the current transformer return conductor.

Connection TB1.3, neutral

Return conductor for the voltage input (TB1.1) and the 12 V DC supply voltage (TB1.13).

If you connect the voltage transformer to measure voltage between two phases on connections TB1:1 and TB1:3, you need to remove the line between P2.23 and TB1:3 on contact TB1:3 and connect it to the motor-drive unit's neutral point.

Connection TB1.4, load current (feeder conductor)

Input for load current measurement. Permissible current range 0...420 mA (200 mA continuous). Load current measurement is used for the "line drop compensation (LDC)" function and for measured value calculation.

Connection TB1.5, 12 V DC auxiliary voltage output

Auxiliary voltage output (12 V DC) for freely configurable inputs. You can remove the jumper between TB1.5 and TB1.6 to switch the state of input GPI2 via an external selector switch.

Damage to voltage regulator

Damage to voltage regulator due to incorrect connection.

- Do not connect connections TB1.5 and TB1.6 to the current transformer.

Connection TB1.6, input GPI2 (freely configurable)

Freely configurable input GPI2 for receiving the auxiliary voltage (12 V DC). You can remove the jumper between TB1.5 and TB1.6 to switch the state of input GPI2 via an external selector switch. Follow the operating instructions for the TAPCON® 250 to configure input GPI2.

Connection TB1.7, tap changer raise output

This switched output connects the raise winding of the motor-drive unit to the source of the motor supply (connection TB1.8). The maximum switching capacity for the output is 6 A at 120/240 V AC.
Connection TB1.8, input for supplying the motor-drive unit

Connection for supplying the motor-drive unit. Maximum permissible voltage of 240 V AC.

Connection TB1.8 is connected to the P2.26 Manual/Auto connection of the TAPCON® 250. As soon as voltage is present at connection TB1.8, the regulator switches to Auto mode. Remove the jumper between TB1.8 and P2.26 if you want to use the P2.26 Manual/Auto input with an alternating voltage source or as a pulsed input.

Connection TB1.9, tap changer lower output

This switched output connects the lower winding of the motor-drive unit to the source of the motor supply (connection TB1.8). The maximum switching capacity for the output is 6 A at 120/240 V AC.

Connections TB1.10 (GPI3), TB1.11 (GPI4), TB1.12 (GPI1)

You can link these inputs to various voltage regulator functions. Follow the operating instructions for the TAPCON® 250 in this regard. The inputs are activated with 12 V DC from connection TB1.5 or TB1.13.

Connection TB1.13, 12 V DC auxiliary voltage output

Output of an unregulated internal DC voltage source with NEUTRAL reference potential (TB1.3). The DC voltage source can be used to supply the digital inputs connected via an external relay. Depending on the voltage at TB1.1 and the connected load, the output voltage is 10...18 V DC. The maximum current is 100 mA; the output is not protected by a fuse in the TAPCON® 250.

Connections TB2.14 and TB2.15, raise/lower tap-change operation in manual mode

These inputs are used for connecting external "raise" or "lower" switches. These inputs allow you to increase or decrease the voltage in manual mode. If you correctly connect the connections for raise/lower tap changer output (TB1.7, TB1.9) and the operations counter connection (TB2.20), manual tap-change operations are detected by the TAPCON® 250 using external switches.

Connections TB2.16 and TB2.17, alarm signal self-test

This pair of connections is a relay for an alarm signal (6 A at 120 V AC) that operates in accordance with the closed-circuit principle. The relay closes in the event of a fault in the voltage supply or the microcontroller.
Connections TB2.18 and TB2.19, freely configurable alarm

This pair of connections is a relay for an alarm signal (6 A at 120 V AC) that operates in accordance with the open-circuit principle. The relay closes if the requirements for the alarm configured in the voltage regulator are met. Follow the operating instructions for the TAPCON® 250 in this regard.

Connection TB2.20, operations counter

Digital input for recording the number of tap-change operations. The operations counter is increased each time connection TB2.20 is set to NEUTRAL (TB1.3). The input is level-dependent. Ensure that any auxiliary voltage is removed from the operations counter connections before installing the TC250-6704 adapter panel together with the TAPCON® 250.

NOTICE

Damage to voltage regulator

Damage to voltage regulator due to incorrect connection.

► Do not attach any voltage sources (12 V DC or 120 V AC) to connection TB2.20.

Connection TB 2.21, Remote input

This input is used for connecting an external remote switch. This switch lets you activate the voltage regulator’s Remote operating mode (e.g. for control via a control system protocol). The Remote operating mode is active if you provide 120 V AC.
Figure 3: Front view and rear view
Figure 4: Side view
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