



## Type test report no. VV 2E 001e

### Switching tests

Product Approval  
CTTP/Wag  
12.08.2016

<b>Type test for types:</b>	Selector switches VACUTAP® VV with <ul style="list-style-type: none"><li>- Single-phase design or three-phase design,</li><li>- maximum rated through-current: 250 A, 400 A or 600 A,</li><li>- maximum rated step voltage: 2000 V.</li></ul>
<b>Test specification:</b>	IEC 60214-1:2014, sub-clause 5.2.3: "Switching tests".
<b>Test sample:</b>	VACUTAP® VV III 600 D – 76 – 12 23 1W, S/N: 1568374
<b>Manufacturer:</b>	Maschinenfabrik Reinhausen GmbH, Regensburg, Germany.
<b>Date of test:</b>	December 2014 to January 2015.
<b>Places of test:</b>	Maschinenfabrik Reinhausen GmbH, Regensburg, Germany.
<b>Tests performed:</b>	
Service duty test:	360,000 operations performed at maximum rated through-current (600 A) and relevant rated step voltage (1000 V).
Breaking capacity test:	40 operations performed at twice the maximum rated through-current (2 x 600 A = 1200 A) and maximum rated step voltage (1000 V). 40 operations performed at maximum rated step voltage (2000 V) and twice the relevant rated through-current (2 x 350 A = 700 A).
<b>Test results:</b>	The requirements of IEC 60214-1:2014 were fulfilled, i.e.: <ul style="list-style-type: none"><li>- The service duty test was passed successfully. Comparison of 100 oscillograms taken at regular intervals during the test did not show a significant alteration in the characteristics of the selector switch in such a way as to endanger the operation of the apparatus.</li><li>- The breaking capacity test was passed successfully. Oscillograms taken for each operation indicated that in no case the arcing time was such as to endanger the operation of the apparatus.</li><li>- The inspection of the selector switch after the tests did not leave any doubts as to the suitability of the tap-changer for service.</li></ul>

This report contains 99 pages.

i. V. Dr. Thomas Strof  
[valid without signature]

Maschinenfabrik Reinhausen GmbH  
- PRODUCT APPROVAL -

Maschinenfabrik Reinhausen GmbH  
Falkensteinstraße 8  
93059 Regensburg, Germany  
Phone +49 941 40 90-0  
info@reinhausen.com  
www.reinhausen.com

Managing Directors:  
Dr. Nicolas Maier-Scheubeck  
Michael Rohde

F01106:20

Chairman of Supervisory  
Board: Hans-Jürgen Thaus  
Commercial register  
Regensburg HRB 3687  
VAT reg. no.: DE133705195

Reinhausen Group

## 1. Test specification

The type test was performed in accordance with IEC 60214-1:2014 "Tap-changers - Part 1: Performance requirements and test methods", sub-clause 5.2.3: "Switching tests".

## 2. Data of test sample

Type designation: VACUTAP® VV III 600 D – 76 – 12 23 1W  
Type characteristics: Selector switch  
Serial number / IBASE: 1568374 / 474131377  
Year of manufacture: 2014  
Manufacturer: Maschinenfabrik Reinhausen GmbH, Regensburg, Germany.

## 3. Scope of application

The type of vacuum interrupter used as main switching contact and transition contact is identical for all selector switches type VACUTAP® VV. The mechanism for opening and closing the vacuum interrupters is adapted to the rotation of the selector switch insert during one operation. The selector switch insert rotates through an angle per operation of:

- 36° between each contact of the 10 pitch selector switch,
- 36° between contacts 11 to 12 and 1 to 12 and 29° between the other contacts of the 12 pitch selector switch.

Due to the 12 pitch selector switch operates with both angles per operation. Thus, testing a 12 pitch selector switch covers also the 10 pitch selector switch.

The mechanism for opening and closing the vacuum interrupters as well as the switching behavior of the vacuum interrupters do not depend on:

- number of phases,
- kind of application (Y- or D-connected),
- maximum rated through-current,
- insulating levels,
- type of change-over selector.

Therefore, this type test report is valid for all selector switches type VACUTAP® VV with following characteristics:

- Number of phases: 1 or 3
- Maximum rated through-current: 250 A, 400 A or 600 A
- Maximum rated step voltage: 2000 V

## 4. Test setup / test arrangement

Mounting and mechanism: The test sample was mounted in a test frame and operated with a motor-drive unit attached outside.

Transition resistors: The design of the transition resistors depends on the custom-designed operation point of the on-load tap-changer.

According to the step capacity diagram of type VACUTAP® VV 600, the tests were performed with following transition resistor mountings:

a. Transition resistor variant 2 (1.67 Ω):

- Service duty test at maximum rated through-current (600 A) and relevant rated step voltage (1000 V).
- Breaking capacity test at twice the maximum rated through-current (2 x 600 A = 1200 A) and relevant rated step voltage (1000 V).

b. Transition resistor variant 4 (3.35 Ω):

- Breaking capacity test at maximum rated step voltage (2000 V) and twice the relevant rated through-current (2 x 350 A = 700 A).

**This page intentionally left blank**

This is a demo version of switching test report. If you need the whole document, please fill the form at the bottom of this page:

<https://bit.ly/34zRnDs>