Test report

The test results relate only to the items tested as mentioned below. This report shall not be reproduced except in full without the written approval of TÜV PRODUCT SERVICE.

report
No
MHM-EST-7.970170053/C
Jakobi

number of copies
1

pages
5

issued date
12.11.97

test
vibration and shock test

test basis / -specification
demand 1

object under test
type designation
identification no.
Rack
europac PRO 3 HE

client
manufacturer
Schroff GmbH
Schroff GmbH
Langenalberstraße 96 - 100
75334 Straubinghaldt

tester
receipt of object under test date
Jakobi
28.01.1997

test date / period of time
29. and 30. 01.1997

drawn up signature
verified signature
[Signatures]
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All these documents are filed in the test report GEL3-UM-7.970170053/A

2 Test equipment

<table>
<thead>
<tr>
<th>Type</th>
<th>manufacturer</th>
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<tbody>
<tr>
<td>shaker</td>
<td>1000 IAR Unholtz-Dickie</td>
</tr>
<tr>
<td>vibration control system</td>
<td>400 AT Unholtz-Dickie</td>
</tr>
<tr>
<td>signal conditioner</td>
<td>104/109 Endevco</td>
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<tr>
<td>accelerometers</td>
<td>4500 Brüel &amp; Kjaer</td>
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<tr>
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<td>226C Endevco</td>
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</table>

The measuring equipments are calibrated regularly according to the calibration instructions of the TÜV PRODUCT SERVICEC GmbH. All calibrations are traced back to national standards.

3 Test procedure

3.1 Object under test

The tested object was a subrack. It was tested in a mounting frame built by the client. The subrack was fitted with 14 dummies (each one 250 g).

3.2 Test specification

3.2.1 Resonance search

- motion: sinusoidal
- frequency range: 5 - 150 Hz
- amplitude: 5 - 150 Hz, 0.2 g
- sweep rate: 1 oct / min.
- test duration: 1 sweep
3.2.2 Resonant dwell

motion: sinusoidal
frequency range: resonance determined like 3.2.1
amplitude: 1 g
test duration: 10 min

3.2.3 Vibration test

motion: sinusoidal
frequency range: 10 – 150 Hz
amplitude: 10 - 60 Hz 0,075 mm pk
60 - 150 Hz 1 g
sweep rate: 1 oct / min
test duration: 1 sweep

3.2.4 Shock tests

Type of shock: half sine
amplitude: 15 g
shock duration: 11 ms
application: 3 shocks per axis, on three mutually perpendicular axes

3.3 Test sequence

<table>
<thead>
<tr>
<th>no.</th>
<th>test</th>
<th>run</th>
<th>axis</th>
<th>page</th>
<th>Measuring points and comments</th>
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<td>/U- 4/1</td>
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<td>-Y</td>
<td>/U- 4/2</td>
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<td>8</td>
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<td>/U- 4/3</td>
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<td></td>
<td>10</td>
<td>-Z</td>
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</table>
4 Test result

The visual inspection showed no damage. A detailed inspection will be done by the customer.

5 Explanation of the measuring diagrams

5.1 Vibration test (see /U-1/ page 1)

1 Frequency range in Hz
2 Acceleration level in g
3 Control channel
4 Reference level
5 Constant acceleration
6 Test duration
7 Measuring level
8 cursor
9 measuring channel
   - frequency: FREQ in Hz
   - acceleration: A in g
   - velocity: V in m/s
   - displacement: D in mm

5.2 resonance list (see /U-1 / page 1)

1 ratio limit
2 measuring channel
3 frequency in Hz
4 test level in g
5 measuring level in g
6 ratio

5.3 shock test (see /U-4 / page 1)

1 reference level in g
2 measuring level in g
3 number of shocks
4 duration

GEL3-UM-7.970170053/B / WJ
SETUP ID: RESONANZ
RUN NAME: RUN3
MINIMUM RATIO 5.00
CHANNEL FREQUENCY (Hz)
6 133.39

CONTROL CHAN LEVEL(g pk)
0.1883

ANALYSIS CHAN LEVEL(g pk) RATIO
11.7244 62.275 54.10

LIST OF RESONANCES
LOG SWEEP # 1 UP
29/01/97 12:05:04

SETUP ID: RESONANZ TEST RUN NAME: RUN3
Schroff europac PRO 3 HE X-achse
19 mV/g AUTO: 00:04:06 STATUS: Finished
MAX SERU SPD 1k TOTAL: 00:04:17 SWEEP TIME: 4.9 Min CHAN 7

29/01/97 12:03:37
DISPLAY C-CTRL A-ALL
D-DRIVE A-A/CT
FREQ 149.6
CH6 LEV 1.50 a
0.0157 U
0.833 D
REF LEV 0.2000 g
CONSTANT nCC
LOG SWP #1 up
of 1
150 Hz
** SETUP ID: RESONANZ**
** RUN NAME: RUN4**

**Schroeff europac PRO 3 HE**

**Y-Achse**

<table>
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<tr>
<th>CHANNEL</th>
<th>FREQUENCY (Hz)</th>
<th>CONTROL CHAN LEVEL(g pk)</th>
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<th>RATIO</th>
<th>Q</th>
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**MAX SERV SPD 1k TOTAL: 08:05:44**
**Sweep Time: 4.9 Min CHAN 7**

**SETUP ID: RESONANZ**
**RUN NAME: RUN4**
**MINIMUM RATIO: 5.00**

**LIST OF RESONANCES**
**LOG SWEEP # 1 UP**

**29/01/97 14:02:40**
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**Schroff europac PRO 3 HE, X-Achse**

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<th>CHN 3</th>
<th>CHN 4</th>
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<td>1.83</td>
<td>4.32</td>
<td>4.36</td>
<td></td>
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</tr>
</tbody>
</table>

**TIME**

- **Frequency** (Hz)
- **Level**
- **Level**

**Display**

- **C-CTRL**
- **6-CH6**
- **D-DRIVE**
- **7-6-CT**

**Freq**

- **133.4**
- **CH6 Lev**
- **43.43 A**
- **0.5078 V**
- **1.212 D**

**Ref Lev**

- **1.000 g**
- **ACC**
- **STEP NO.**
- **1**
- **PH. REF.**

**Auto CyC**

- **88 k**
- **Auto**
- **00:18:00**

**Status**

- **Finished**

**10 nV/g**

- **Total**
- **00:18:00**
- **Level**
- **8.8 dB Ch 7 ampl, 6 phase PHASE 2.6°**

**986 159 Hz**
### SETUP-ID: RESUERU TEST RUN NAME: RUN4

Schroff europac PRO 3 HE, Y-Achse

<table>
<thead>
<tr>
<th>TIME</th>
<th>FREQ (Hz)</th>
<th>LEVEL CHN 7</th>
<th>LEVEL CHN 6</th>
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<td>1.82</td>
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<td>00:10:00</td>
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**AUTO CYC**: 24k **AUTO**: 00:10:00 **STATUS**: Finished

18 mV/g **TOTAL**: 00:10:50 **LEVEL**: 0.8 dB CH 7 ampl., 6 phase **PHASE**: 1.2°

### SETUP-ID: RESUERU TEST RUN NAME: RUNS

Schroff europac PRO 3 HE, Y-Achse

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<tr>
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<th>FREQ (Hz)</th>
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<tbody>
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**AUTO CYC**: 88k **AUTO**: 00:10:00 **STATUS**: Finished

18 mV/g **TOTAL**: 00:12:05 **LEVEL**: 0.8 dB CH 7 ampl., 6 phase **PHASE**: 3.4°
SETUP-ID: RESVERU TEST RUN NAME: RUN7
Schroff europac PRO 3 HE, Z-Achse

<table>
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<td>17.92</td>
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</table>

AUTO CYC 61k AUTO: 00:10:00 STATUS: Finished
18 mV/g TOTAL: 00:10:51 LEVEL: 8.8 dB CH 2 ampl, 3 phase PHASE 8.3°
SETUP-ID: SCHROFF  TEST RUN NAME: RUN3
europac PRO 3 HE, X-Achse

29/01/97
13:41:32
DISPLAY
C-CTRL
A-ALL
D-DRIVE
FREQ= 18.29
CH6 LEV= 0.03 A
0.0053 V
0.164 D
REF LEV=.150 mm
CONSTANT
DISP
LOG SWP#
20 20
of 20
Hz

10 mV/g  AUTO: 01:18:08  STATUS: Finished
MAX SERV SPD 1k TOTAL: 01:18:19  SWEEP TIME: 3.9 Min  CHAN 7
Bild 1: Zur Verdeutlichung der Anregungsachsen

Bild 2: Meßstelle