

# CERTIFICATE

Number: **2133599.01**



Issued to:  
Applicant:

**Marquardt GmbH**  
**Schloss-Strasse 16**  
**78604, Rietheim-weilheim, Germany**

Manufacturer/Licensee:

**Marquardt GmbH**  
**Schloss-Strasse 16**  
**78604, Rietheim-weilheim, Germany**

Product(s) : rocker switches  
Trade name(s) : MARQUARDT  
Type(s)/model(s) : 193..

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

KEMA Quality hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard EN 61058-1:2002 + A2:2008
- an inspection of the production location according to CENELEC Operational Document CIG 021
- a certification agreement with the number 983346

KEMA Quality hereby grants the right to use the ENEC KEMA-KEUR certification mark.

The ENEC KEMA-KEUR certification mark may be applied to the product as specified in this certificate for the duration of the ENEC KEMA-KEUR certification agreement and under the conditions of the ENEC KEMA-KEUR certification agreement.

This certificate is issued on: 09 April 2010 and expires upon withdrawal of one of the above mentioned standards.

KEMA Quality B.V.

drs. G.J. Zoetbrood  
Managing Director

H.R.M. Barends  
Certification Manager

ACCREDITED BY  
THE DUTCH COUNCIL  
FOR ACCREDITATION



© Integral publication of this certificate is allowed

## SPECIFICATION OF THE CERTIFIED PRODUCT

### Product data

product	:	rocker switches
trade name(s)	:	MARQUARDT
type(s)	:	1932., 1934., 1935., 1939.
type reference	:	common type
type of switch	:	incorporated
rated current/voltage	:	see product data
circuit to be controlled	:	- resistive and motor - resistive and peak surge load
temperature limit	:	T105/55
frequency of operation	:	see product data
class	:	for class II appliances
degree of protection	:	IP64 or IP65
degree of pollution	:	3
category to heat and fire	:	850 °C
insulating material	:	tracking resistant (250V)
terminals	:	- solder terminal - PCB terminals - tab terminals (4,8 x 0,8 and 6,3 x 0,8 mm),
description	:	body and actuating member of thermoplastic material, provided with a rubber enclosure
markings	:	trade name, type reference, electrical ratings and temperature limit on the body

### Additional information

The degree of protection depends on the method of mounting and should be realized in the appliance.

Additional tests according to Clause 30 of the following standards are performed with positive results for switches marked with the letter "G" on the switch or the label of the smallest shipping container.

- IEC 60335-1:2001
- EN 60335-1:2002

Resistance to heat and fire: Insulation material around connections within an area of 3,0 mm.

- Glow-wire test 750°C; no flame
- Glow-wire test 850°C; flame, if any, extinguished within 30 seconds after removal the glow-wire
- Glow-wire Ignition Temperature  $\geq 775$  °C

Tested on raw material plates with the thickness of 0,75 mm, 1,5 mm and 3,0 mm.

## Product data - type 1932.

pattern nos.	:	1 and 2
ratings	:	- 20(4) A - 250 V~, 1E4 - 10(8) A - 250 V~, 5E4 - 10(8) A - 400 V~, 5E4 - 6(4) A - 250 V~, 5E4 - 5/120 A - 250 V~, 1E4
design	:	without illumination
contact opening	:	full disconnection

## Product data - type 1934.

pattern nos.	:	6 and 6/2
ratings	:	- 10(8) A - 250 V~, 5E4 - 6(4) A - 250 V~, 5E4 - 5/100 A - 250 V~, 1E4
design	:	with or without illumination
contact opening	:	full disconnection

## Product data - type 1935.

pattern nos.	:	1 and 2
ratings	:	- 20(4) A - 250 V~, 1E4 - 10(8) A - 250 V~, 5E4 - 10(8) A - 400 V~, 5E4 - 6(4) A - 250V~, 5E4 - 5/120 A - 250 V~, 1E4
design	:	with illumination
contact opening	:	full disconnection

## Product data - type 1939.

pattern nos.	:	4 and 4/2
ratings	:	- 12(4) A - 250 V~, 1E4 - 6(4)A - 250V~, 1E4 - 4(2) A - 250 V~, 5E4
design	:	momentary or continuous contact, without illumination
contact opening	:	micro disconnection

## TESTS

### Test requirements

EN 61058-1:2002 + A2:2008

### Test result

The test results are laid down in KEMA Quality test file 2133599.01.

### Remarks

This certificate replaces our certificate 2093612.01 dated May 10, 2006 and is also partly based on the results of that certificate.

### Conclusion

The examination proved that all test requirements were met.

Tested by : L.S.M. Mooi

Checked by : E. Stoel



### Factory locations

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File E41791  
Project 03CA23724

2003-08-20

REPORT

on

COMPONENT - SPECIAL-USE SWITCH

Marquardt GmbH  
Weilheim, Fed. Rep. of Germany

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## DESCRIPTION

## PRODUCT COVERED:

USR, CNR - Component, Special-Use Switches

Cat. No	Electrical Rating	Temp. °C	POL/THR	PP	ENDUR	SPCOA
193 w/wo 2 w/wo suff .0000 thru .9999 w/wo code R11 wo illumination	16 A 125-250 V ac 1/3 hp 125 V ac 1 hp 250 V ac	65	1,2/1	PP	6000	-
193 w/wo 4 w/wo suff .0000 thru .9999 w/wo code R213 w/wo illumination	14 A 125-250 V ac 1/3 hp 125 V ac 1 hp 250 V ac	65	1,2/2	PP	6000	-
193 w/wo 5 w/wo suff .0000 thru .9999 w/wo code R11 w/ illumination	16 A 125-250 V ac 1/3 hp 125 V ac 1 hp 250 V ac	65	1,2/1	PP	6000	2, A1
<b>193 w/wo 9 w/wo suff .0000 thru .9999 w/wo code R218</b>	<b>4A 125 V dc 8A 18 V dc</b>	<b>65</b>	<b>1,2/2</b>	<b>PP</b>	<b>6000</b>	<b>-</b>

CAT NO: Suffix numbers or letters be added, indicating contact arrangement, type or actuator and mechanical details.

w/wo - with or without

w/ - with

w/o - with out

POL/THR: # of Poles/# of Throws. "M" indicates "Multi"  
(e.g. 2/M indicates 2 pole, Multi-throw)

PP: Per Pole, "PP" in this column indicates each pole may carry the rated current

(for 2 or more pole switches), with opposite polarity between adjacent poles.

ENDUR: Endurance rating

SPCOA: Applicable Special Conditions of Acceptability are indicated here in numeric form. Refer to the following pages for corresponding Special Conditions of Acceptability.

GENERAL:

These devices are single- and double- pole, single-**and double-** throw special-use switches. All switches covered by this report may be with momentary or continuous contact.

ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

Use - The switches covered by this Report are for use only in complete equipment where the suitability of the combination is determined by Underwriters Laboratories Inc.

The switches were evaluated to the Standard for Special Use Switches, UL 1054.

Products designated USR have been investigated using requirements contained in Underwriters Laboratories Standard for Special Use Switches, UL 1054, **6<sup>th</sup> Edition**.

Products designated CNR have been investigated using requirements contained in Canadian Standard C22.2 No. 55-M1986.

## STANDARD CONDITIONS OF ACCEPTABILITY

General - The following five Conditions of Acceptability apply to all switches covered by this Report.

1. The switch terminals have been investigated for use only with copper wire or copper alloy quick-connect terminals.
2. A standard sized quick-connect tab (per Table 7.1 of UL 1054) is to be mated with the appropriate standard size quick-connect connector. The tab is provided with a detent that shall be properly matched to the connector.
3. The spacing between any terminals and a flat mounting surface has been judged in accordance with the Standard for Special-Use Switches (UL 1054). However, the spacing requirements between the connection when installed on the terminal and the mounting surface shall comply with the end-use Standard spacings.
4. For switches with integral leads, the temperature rating of the leads is 60°C minimum unless the leads are surface marked with a higher rating.
5. The switch has been subjected to a minimum 6000 Cycle Endurance Test.

## SPECIAL CONDITIONS OF ACCEPTABILITY

General - One or more of the following Conditions of Acceptability apply as indicated in the Product Covered table beginning on Page 1 of this Report under the SPCOA (Special COA's) column.

1. The nonstandard quick-connect tabs (i.e. other than noted in Table 7.1 of UL 1054) have been investigated with a specific nonstandard connector attached to wires of a specified size.

2. These are lighted switches employing a lamp. The lamp life should be evaluated when required by the end-use product Standard.

3. The switch has openings in the housing adjacent to arcing parts. The end-use application may involve environments (such as excessive dust or adjacent combustible material) that would exclude an opening in the switch housing.

4. These are diaphragm activated water level switches. Samples of the diaphragm have been subjected to aging tests for use at a specific temperature (shown within parenthesis in °C) and have also been examined for tensile strength and elongation after exposure to detergent. However, if the switch is mounted below the level of water which indirectly actuates it and the switch has an integral metal case, the metal case is to be considered a live part.

5. These are speed control switches. The investigation was limited to the switching function of the switch. In the final application it should be determined that the speed control circuit can be used with a particular appliance without resulting in a hazardous condition such as overheating of a motor or the switch in other than the full speed position. Open and shorted components of the speed control circuit shall be evaluated for compliance with the end-use Standard.

6. The switch employs screw-type pressure wire connectors or push-in terminals. These have been evaluated for use with solid and/or solder-dipped stranded conductors of a specified size (shown within parenthesis in AWG).

7. These switches employ an integral potentiometer. The investigation was limited to the switching function of the switch. The insulating materials and the spacings of the integral potentiometer should be investigated for compliance with the end-use product Standard.

8. The switch employs auxiliary contacts located externally to the main switch contact chamber. The auxiliary contacts were not tested as part of this investigation. The suitability of the auxiliary contacts must be determined in accordance with the end-use Product Standard.

A1. The supply source of the bulb circuit was not evaluated during the investigation of the switch. The suitability of this feature shall be determined in the end-use application.

## CONSTRUCTION DETAILS:

Refer to the following descriptive pages and accompanying photographs for details. The general design, shape and arrangement of parts shall be as shown in the photographs except where variations are specifically described.

Overall dimensions of the decorative parts of the housing (body / cover) and actuator (actuating member) may vary.

Corrosion Protection - All ferrous metal parts are protected against corrosion by plating, painting, galvanizing or equivalent.

Spacings - Spacings between uninsulated live-metal parts of opposite polarity and also those parts and dead-metal parts including openings for mounting screws are not less than 3/64 in (1.2 mm) through air or over surface for switches rated 250 V or less, and not less than 1/8 in (3.2 mm) for switches rated 251 V or greater unless noted.

## MARKING:

Only the following items (a) and (b) for CNR (f) are required on the switch body, since there is limited space on the surface of the switch. All markings are included in the instruction manual and/or on the smallest shipping container.

- a. Recognized company name and/or Trade Mark or UL-File No. (as described in the UL report)
- b. Electrical ratings and/or rating code
- c. Full Catalog Number
- d. Factory code (if more than one location as described in the UL report)
- e. The UL Recognized Component Mark
- f. The cUL or cULus Recognized mark for Canada
- g. Switches with body and socket made of V0 material may be marked on the smallest shipping container with "V0"**

SERIES 193. (covers switch types 1932. and 1935.)

FIG. 1

General - The general design, shape, and arrangement shall be as illustrated (on FIG. 1) except where variations are specifically described.

Circuit - Single and Double -pole, Single -throw switches.

1. Body - R/C (QMFZ2), Type Ultramid A3K by BASF, or A3K, LA70 K by BADA, rated V2, 65°C. Minimum thickness: 0.6 mm, overall dimension 34.9 mm by 26.2 mm by 19.3 mm

Alternate - R/C (QMFZ2), Type Ultramid C3U by BASF, or C3U, LC70FRHF by BADA rated V0.

2. Socket - R/C (QMFZ2), Type Ultramid A3K by BASF, or A3K, LA70 K by BADA, rated V2, 65°C. Minimum thickness: 0.6 mm, overall dimension 27.4 mm by 21.7 mm by 27.3 mm

Alternate - R/C (QMFZ2), Type Ultramid C3U by BASF, or C3U, LC70FRHF by BADA, rated V0.

3. Rocker - R/C (QMFZ2), Type Ultramid A3K by BASF, or A3K, LA70 K by BADA, rated V2, 65°C. Minimum thickness at current carrying parts: 0.6 mm, overall dimension 19.0 mm by 18.9 mm by 17.8 mm.

Alternate - R/C (QMFZ2), Type Ultramid C3U by BASF, or C3U, LC70FRHF by BADA, rated V0.

4. Spring - (DPST two provided). spring steel, overall dimensions 12 mm free length, 2.4 mm OD, 0.43 mm wire diameter.

Alternate - (SPST one provided) spring steel, overall dimensions 12.6 mm free length, 2.4 mm OD, 0.48 mm wire diameter.

Alternate - ( one or two provided). Spring steel, overall dimensions 12.2 mm free length, 2.4 mm OD, 0.38 mm wire diameter.

5. Actuator - R/C (QMFZ2), Type Makrolon 2405 or 2805 by Bayer, rated min. HB, 115°C. Minimum thickness: 0.81 mm, , overall dimension 28.0 mm by 19.4 mm by 7.5 mm. Can be provided with a rubber sealing membrane which counter fitted to the body.
6. Contact Bridge with movable contact - (One or two provided) plated copper alloy, overall dimension 11.2 mm by 5.9 mm by min 1.9 mm, min. thickness 0.60 mm, provided with silver contact disc, overall dimensions 2.3 mm dia by min 0.65 mm thick, riveted or welded to the bridge.
- \*7. Terminal with fixed contact -(One or two provided) snap fitted in socket, plated copper alloy, min dimensions 14.0 mm by 7.8 mm by **min 2.0** mm, min thickness 0.8 mm provided with silver contact disc, 2.1 mm dia by 0.2 mm thick, riveted **or welded**. Standard Quick connect terminals can be 4.8 mm or 6.3 mm wide.

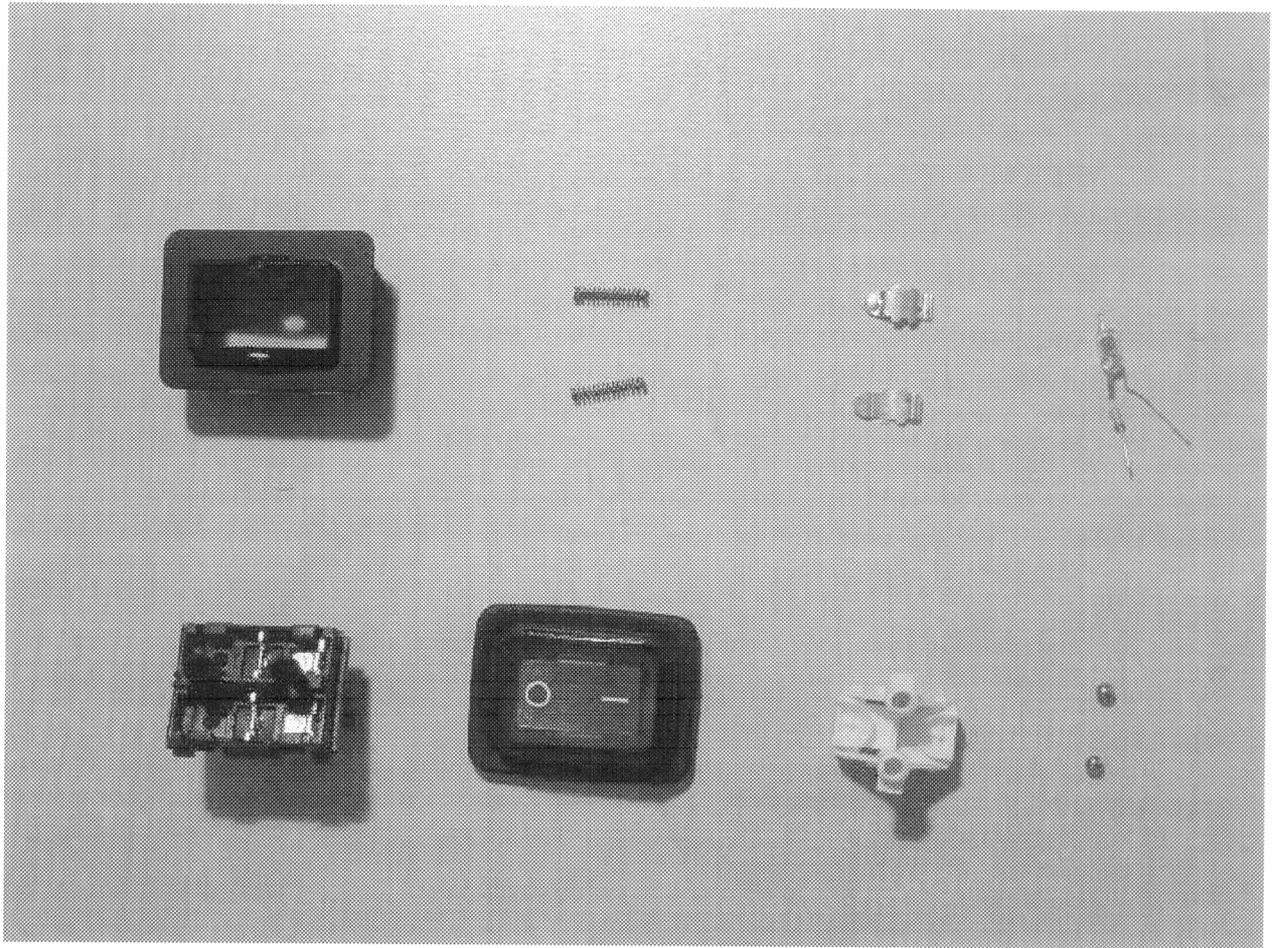
Alternate - solder terminals with 2.4 mm dia. solder lug can be used.

SERIES 193. (covers switch types 1932. and 1935.) Cont'd

8. Terminal w/o contact - (One or two provided) snap fitted in socket, plated copper alloy, overall dimensions 14.0 mm by 7.8 mm by 1.0 mm, min thickness 0.8 mm. Standard Quick connect terminals can be 4.8 mm or 6.3 mm wide.

Alternate - solder terminals with 2.4 mm dia. solder lug can be used.

9. Steel Ball -(One or two provided) Overall dimension 3 mm dia



SERIES 193. (covers switch types 1934.) FIG. 2

General - The general design, shape, and arrangement shall be as illustrated (on FIG. 2) except where variations are specifically described.

Circuit - Single and Double -pole, Double-throw switches.

1. Body - R/C (QMFZ2), same as Item 1, Fig. 1
2. Socket - R/C (QMFZ2), same as Item 2, Fig. 1
3. Rocker - R/C (QMFZ2), same as Item 3, Fig. 1
4. Spring - same as Item 4, Fig. 1
5. Actuator - R/C (QMFZ2), same as Item 5, Fig. 1
6. Contact Bridge with movable contact - (One or two provided), plated copper alloy, overall dimension 13.3 mm by 5.9 mm by 2.8 mm, min. thickness 0.60 mm, provided with silver contact disc, overall dimensions 1.6 mm dia by 0.65 mm thick, riveted **or welded** to the bridge.
7. Terminal with fixed contact - (two or four provided), same as Item 7, Fig. 1
8. Terminal w/o contact - (One or two provided), same as Item 8, Fig. 1
9. Steel Ball -(One or two provided), same as Item 9, Fig. 1
10. Lamp - (Optional) (Not shown), same as Item 10, Fig. 1
11. Spring - (for momentary function), same as Item 11, Fig. 1



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SERIES 193. (covers switch types 1939.)

FIG. 3

General - The general design, shape, and arrangement shall be as illustrated (on FIG. 3) except where variations are specifically described.

Circuit - Single and Double -pole, Double-throw switches with center off.

1. Body - R/C (QMFZ2), same as Item 1, Fig. 1
2. Socket - R/C (QMFZ2), same as Item 2, Fig. 1
3. Rocker - R/C (QMFZ2), same as Item 3, Fig. 1
4. Actuator - R/C (QMFZ2), same as Item 5, Fig. 1
5. Contact Bridge with movable contact - (One or two provided), plated copper alloy, overall dimension 16.6 mm by 5.0 mm by 4.8 mm, min. thickness 0.5 mm, provided with silver contact disc, overall dimensions 2.0 mm dia by 0.65 mm thick, riveted or welded to the bridge.
6. Terminal with fixed contact - (two or four provided), same as Item 7, Fig. 1
7. Terminal w/o contact - (One or two provided) snap fitted in socket, plated copper alloy, overall dimensions 16.5 mm by 8 mm by 3.2 mm, min thickness 0.8 mm. Standard Quick connect terminals can be 4.8 mm or 6.3 mm wide.
8. Spring - (for momentary function), same as Item 11, Fig. 1
9. Spring (DPDT two provided) spring steel, overall dimensions 7.1 mm free length, 2.5 mm OD, 0.34 mm wire diameter.  
  
Alternate - (SPDT, one provided) spring steel, overall dimensions 5.6 mm free length, 2.5 mm OD, 0.36 mm wire diameter.
10. Plunger (Spring mounted in Rocker) - R/C (QMFZ2), Type A4H by BASF, rated V2, 115°C. Min. thickness: 1.7 mm overall dimensions 8.5 mm by 3.2 mm by 2.0 mm.



N090515081

TEST RECORD NO. 1

SAMPLES

This investigation was conducted by KEMA Nederland B.V., Arnhem, the Netherlands, in accordance with the KEMA/UL Cooperative Agreement. The project was reviewed by UL and found to be in compliance with the requirements. The Strength of Actuator Test was conducted by UL International Germany GmbH, Neu Isenburg.

Representative samples of switches in commercial form were submitted by the manufacturer for review and testing in accordance with the Standard for Special-Use Switches, UL 1054 6<sup>th</sup> Edition and subjected to the following tests.

DPST Cat. No. 193. Code R11  
Rating           16 A 250 V ac,  
                  1/3 hp 125 V ac,  
                  1 hp 250 V ac

TEST SEQUENCE

Horsepower Overload  
Overload  
Endurance  
Temperature  
Dielectric Withstand  
Strength of Actuator

Note: The same set of six samples was used for the Overload, Endurance, Temperature and Dielectric Tests. A separate set of 6 samples was used for each Horsepower Overload Test. Another separate set of 6 samples were used to Strength of Actuator Test

## HORSEPOWER OVERLOAD TEST:

CAT. NO. 193. 1/3 hp 125 V ac, CODE R11

## METHOD

The switches were connected in a circuit controlling an inductive load, 43.2 A with a 45 percent power factor at rated voltage (125 V ac, 60 Hz). The open circuit voltage was between 125 V (rated voltage) and 131 V (105 % of the rated voltage). The switches were operated manually by means of its actuating member or by mechanical means for 50 cycles of operation at a rate of 6 to 10 cycles per minute.

The dead-metal parts of the switches were grounded through a 2 A quick-acting plug type fuse. The switch contacts were located in the ungrounded conductor of the source of supply and at 125 V to ground.

## RESULTS

There was no electrical or mechanical malfunction of any switch and the grounding fuse did not rupture.

## HORSEPOWER OVERLOAD TEST:

CAT. NO. 193. 1 hp 250 V ac, CODE R11

## METHOD

The switches were connected in a circuit controlling an inductive load, 48 A, with a 45 percent power factor at rated volts (250 V ac, 60 Hz). The open circuit voltage was between 250 V (rated voltage) and 262 V (105 % of the rated voltage). The switches were operated manually by means of its actuating member or by mechanical means for 50 cycles of operations at a rate of 6 to 10 cycles per minute.

The dead-metal parts of the switches were grounded through a 2 A, quick-acting, plug type fuse. The switch contacts were located in the ungrounded conductor of the source of supply and at 250 V to ground.

## RESULTS

There was no electrical or mechanical malfunction of any switch and the grounding fuse did not rupture.

**OVERLOAD TEST:**

CAT. NO. 193. 16 A 250 V ac, CODE R11

**METHOD**

The switches were connected in a circuit controlling an inductive load, 20 A, with a 78 percent power factor at rated volts (250 V ac, 60Hz). The open circuit voltage was between 250 V (rated voltage) and 262 V (105 % of the rated voltage). The switches were operated manually by means of its actuating member or by mechanical means for 50 cycles of operations at a rate of 6 to 10 cycles per minute.

The dead-metal parts of the switches were grounded through a 2 A, quick-acting, plug type fuse. The switch contacts were located in the ungrounded conductor of the source of supply and at 250 V to ground.

**RESULTS**

There was no electrical or mechanical malfunction of any switch and the grounding fuse did not rupture.

**ENDURANCE TEST:****METHOD**

The switches were connected in a circuit controlling an inductive load of 16 A at 250 V ac, 60 Hz, with a power factor of 78 percent. The open circuit voltage was between 250 V (rated voltage) and 262 V (105 % of the rated voltage). The switches were operated mechanically for 6000 cycles at a rate of 6 to 10 cycles per minute making and breaking its rated current.

The dead-metal parts of the switches were grounded through a 2 A, quick-acting, plug type fuse. The switch contacts were located in the ungrounded conductor of the source of supply and at 250 V to ground.

**RESULTS**

There was no electrical or mechanical malfunction of any switch and the grounding fuse did not rupture.

## TEMPERATURE TEST:

## METHOD

The same switches tested in the Endurance Test were connected in a circuit carrying 16 A. AWG 12 leads were attached to each wiring terminal. Thermocouples were attached at the point of entrance to each wiring Terminal of the switch. No. 28-32 AWG iron and constantan thermocouples were used. Operation was continued until constant temperatures were obtained. The current was supplied from a rated voltage source.

## RESULTS

<u>Terminal No.</u>	<u>Temperature Rises °C</u>					
	<u>Samples</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1	16	18	20	15	17	25
1a	13	20	20	19	17	29
2	15	16	16	17	17	26
2a	15	20	23	17	16	28

Ambient temperature was 25°C.  
The max temperature rise was 29°C.

## DIELECTRIC VOLTAGE WITHSTAND TEST:

## METHOD

The switches were subjected to a 50 Hz potential applied between:

- A. Live parts of opposite polarity.
- B. Live parts and dead-metal parts including the mounting surface.

The potential was started at zero and gradually increased to 1000 V and maintained for 1 minute. The switches were in a thoroughly heated condition from the Temperature Test.

## RESULTS

There was no indication of dielectric breakdown.

## STRENGTH OF ACTUATOR:

## METHOD

Six additional switch samples were placed in an air circulating oven maintained at a temperature of 65°C for a minimum of 1 h. Immediately after removal from the oven, each individual sample was manually subjected to 25 cycles of make and break (not controlling a load).

## RESULTS

The switches were mechanically operable following this test.

TEST RECORD NO. 2

SAMPLES:

The manufacturer submitted samples of the Cat. No(s). as described within this report for investigation. Due to similarities of this device with models previously covered under this report, no additional tests were considered necessary.

Test Record Summary:

The products now covered by this report comply with the applicable requirements and therefore are judged eligible to bear the UL Mark as described on the Conclusion Page of this report.

Test Record No. 2 by:

Reviewed by:

**K.Köster**

K. Köster  
Project Engineer  
UL International Germany GmbH

**N.Friggi**

N. Friggi  
Engineering Team Leader  
UL International (UK) Ltd

Any information and documentation provided to you involving UL Mark services are provided on behalf of Underwriters Laboratories Inc.

TEST RECORD NO. 3

SAMPLES:

Sample of the switch series 1932 and 1935 as constructed as described herein, were submitted by the manufacturer for examination to adding alternate plastic material on these models.

General:

Testing of the switch series 1932 and 1935 were not considered necessary based on the results of previous investigations and since new plastic material C3U manufactured by BASF has the same or better PLC's as already approved material.

The results of the above examination have been reviewed and found to comply with the requirements in the Standard for Special-Use Switches, UL 1054, 6th Edition.

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in UL 1054 6<sup>th</sup> edition, Rev. 2005-09-30 and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:

Reviewed by:

Giuliano Marroco

Karsten Köster

Giuliano Marroco

Karsten Köster

Project Engineer

Senior Project Engineer

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

TEST RECORD NO. 4

## SAMPLES:

Samples of the special use switch model 1934 as indicated below and constructed as described herein, were submitted by the manufacturer for examination and test.

The Model 1934 was used for test purposes and considered representative of the entire series of this investigation. In addition cUR was added for the already investigated switches.

## GENERAL:

Test results relate only to the items tested.

The following tests were conducted with the results indicated.

UL Standard Test	Canadian Standard Test	UL Standard Clauses	Canadian Standard Clause
(HorsePower) Overload Test	Overload Test	16.1	6.2
Overload Test	Overload Test	16.1	6.2
Endurance Test	Endurance Test	17.1	6.3
Temperature Test	Temperature Test	19.1	6.4
Humidity Conditioning And Dielectric Withstand Test	Dielectric Strength Test	20.1	6.5

No tests have been conducted fur cUR addition based in previous investigations in this section.

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in the Standard for Special-Use Switches, UL 1054, 6th Edition and Canadian Standards Association C22.2 No. 55-M1986, 3rd Edition.

## Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in UL 1054, Sixth Edition, Dated August 8, 2003 and Canadian Standards Association CSA C22.2 No. 55-M1986, 2003 Edition, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:

Giuliano Marroco

Giuliano Marroco

Project Engineer

Reviewed by:

Karsten Köster

Karsten Köster

Senior Project Engineer

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

TEST RECORD NO. 5

SAMPLES:

Samples of the special use switch model 1934 as indicated below and constructed as described herein, were submitted by the manufacturer for examination.

GENERAL:

No test and no examination have been conducted due to an update of the missing page no. 7 which has been deleted in error.

The results of the above examination have been reviewed and found to comply with the requirements in the Standard for Special Use Switches, UL 1054 6th edition and CSA C22.2 No. 55-M1986.

TEST RECORD SUMMARY:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in UL 1054 6th edition, Rev. 2005-09-30 and CSA 22.2 No. 55-M1986, Rev. 2003 and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:

H. Schobbe

Holger Schobbe

Engineering Project Handler

UL International Germany GmbH

Reviewed by:

K. Koester

Karsten Koester

Engineering Team Leader

UL International Germany GmbH

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

TEST RECORD NO. 6

SAMPLES:

Samples of the special use switch model 1939 as indicated below and constructed as described herein, were submitted by the manufacturer for examination.

GENERAL:

New series 1939.xxxx, rated 125 V dc, 4 A and 18 V dc, 8 A have been added to report. Following tests as outlined below were conducted. Previously described switches type 1932, 1934 and 1935 have been supplemented with new materials. All materials are similar to the previous described materials and in according with UL1054, and in their established ratings.

Test results relate only to the items tested.

Test Sequence -

Overload	UL 1054, Sec. 16 / CAN, Cl. 6.2
Endurance	UL 1054, Sec. 17 / CAN Cl. 6.3
Continuity	UL 1054, Sec. 18
Temperature	UL 1054, Sec. 19 / CAN, Cl. 6.4
Dielectric-Voltage Withstand	UL 1054, Sec. 20 / CAN, Cl. 6.5

For details see Datasheet package 1, attached to this Test Record.

Tests were considered covered as follows:

Test	File Reference	Report Date	Test Record No.
Effect of Heat on Actuating Members, UL 105, Sec 23 /CAN Cl. 6.12	E41791	2003-08-20	1

The results of the above examination have been reviewed and found to comply with the requirements in the Standard for Special Use Switches, UL 1054 6th edition and CSA C22.2 No. 55-M1986.

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in UL 1054 6th edition, Rev. 2008-10-22 and CSA 22.2 No. 55-M1986, Rev. 2003 and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:  
HOLGER SCHOBBE  
Engineering Project Handler  
UL International Germany GmbH

Reviewed by:  
KARSTEN KOESTER  
Engineering Team Leader  
UL International Germany GmbH

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## CONCLUSION

Samples of the products covered by this Report have been found to comply with the requirements covering the category and the products are judged to be eligible for Component Recognition and Follow-Up Service. Under the Service the manufacturer is authorized to use the Recognized Marking described in the Follow-Up Service Procedure on such products which comply with said Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the Recognized Markings are considered as Recognized Components by Underwriters Laboratories Inc.

Report by:

*K. Henrici*

K Henrici  
Project Engineer  
UL International Germany GmbH

Reviewed by:

*N. Friggi*

N Friggi  
Engineering Team Leader  
UL International (UK) Ltd

Pursuant to the Corporate Services Agreement between UL International Germany GmbH and Underwriters Laboratories Inc. ("UL"), UL hereby accepts and issues this Report.

Number of pages in this package 22

TEST LOCATION:			
<input type="checkbox"/> UL or Affiliate	<input type="checkbox"/> WTDP	<input checked="" type="checkbox"/> CTDP	<input type="checkbox"/> OTHER
Company Name	Marquardt GmbH		
Address	Schloss Strasse 16, 78604 Rietheim-Weilheim Germany		

CLIENT INFORMATION	
Company Name	Marquardt GmbH
Address	Schloss Strasse 16 78604 Rietheim-Weilheim Germany

ADDIT INFORMATION:		
Description of Tests	Per Standard No.	Edition
<input checked="" type="checkbox"/> Tests Conducted by -	Markus Braunger	<i>Ul. Braunger</i>
	Printed name	Signature
<input checked="" type="checkbox"/> Reviewer at client facility (CTDP only)	Dr. B. MARTIN	<i>[Signature]</i>
<input type="checkbox"/> UL Staff witnessing testing (WTDP only)	Printed name	Signature
Reviewed and accepted by qualified Project Handler	GIULIANO MARROCO	GIULIANO MARROCO
	Printed Name	Signature

The following tests conducted in accordance with UL 1054 were considered representative of the same tests required by Canadian Standard, CSA 22.2 No. 0 / No. 55.

TESTS TO BE CONDUCTED:			
Test No.	Done	Test Name	<input type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by ++
		MOLD STRESS TEST:	
5	OK	(HORSEPOWER) OVERLOAD TEST:	SET 2,3,4
1	OK	OVERLOAD TEST:	SET 1
2	OK	ENDURANCE TEST:	SET 1
		CONTINUITY TEST:	
3	OK	TEMPERATURE TEST:	SET 1,4
		DIELECTRIC WITHSTAND TEST:	
		ENDURANCE CONTINUED TEST: (TV rated switch)	
		PULLOUT TESTS (PUSH-IN TERMINALS)	
		30 DAY TEMPERATURE TEST (PUSH-IN TERMINALS):	

Only those products bearing the UL Mark should be considered as being covered by UL

TESTS TO BE CONDUCTED:			
Test No.	Done	Test Name	<input type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by --
		MECHANICAL ENDURANCE TEST: (Voltage Select Switch)	
		INSERTION WITHDRAWAL TEST: (Quick-connect terminals)	
		STRENGTH OF ACTUATOR: (Effect of Heat on Actuating Member)	
4	OK	HUMIDITY CONDITIONING AND DIELECTRIC WITHSTAND TEST: (spacings test)	SET 1.4

The test facility was deemed to have the environment and capabilities necessary to perform the tests included in this data package. (WTD? Only)

Test Equipment- See "TEST EQUIPMENT INFORMATION"  
 Samples - See "TEST SAMPLE IDENTIFICATION"

Instructions -  
 - - When all tests are conducted by one person, printed name and signature can be inserted here instead of including printed name and signature on each page containing data. Must indicate number of pages in the data package.  
 -- - When test conducted by more than one person, printed name and signature of person conducting the test can be inserted next to the test name instead of including printed name and signature on each page containing data. Must indicate number of pages in the data package.

Special Instructions -

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, C 23 °C ± 5 K Relative Humidity, % 50 % ± 20 % Barometric Pressure, mBar 1010 MBAR ± 30 MBAR

Project No. 07C A 12344

File E41791

Page 3

Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

TEST EQUIPMENT INFORMATION

Inst. ID No.	Instrument Type	Test Number +, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date
466.0074.001	Clamp Power meter	1,2,3,5, Overload, HP, Endurance, Temperature	Current / A	2006-11-28	2007-11-28
480.0148.001	Oscilloscope	1,2,5 Overload, Endurance, HP	Time / s	2006-04-07	2007-04-07
467.0013.001	Current Probe Amplifier	1,2,5 Overload, Endurance, HP	Current / 5A	2006-04-07	2007-04-07
466.0027.001	Current Probe	1,2,5 Overload, Endurance, HP	N/A	2006-04-07	2007-04-07
460.0057.001	Data Recorder	3, Temperature test	Temp. / °C	2007-01-14	2008-01-14
473.0003.001	High Voltage	4, Dielectric Withstand	High Voltage / 6 kV	2006-10-25	2007-10-25

† - If Test Number is used, the Test Number must be identified on the data sheet pages or on the Data Sheet Package cover page.

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.	Last Cal. Date	Next Cal. Date
466.0074.001	Metrawatt / Metraclip 81 / SN.104310020810	2006-11-28	2007-11-28
480.0148.001	Hewlett Packard / 54601B / SN. US35430145	2006-04-07	2007-04-07
467.0013.001	Tektronix / AM 503B / SN. B032273	2006-04-07	2007-04-07
466.0027.001	Tektronix / A6304XL / SN. B010793	2006-04-07	2007-04-07
460.0057.001	Yokogawa / DX 230-1-2 / S5FC05403	2007-01-14	2008-01-14
473.0003.001	ECK / W-500-6A / SN. 8910003	2006-10-25	2007-10-25

The M&TE used for tests have minimum required accuracy and range/functions, and were calibrated to assure these levels.

Test equipment information is recorded on UL's Laboratory Project Management (LPM)/Laboratory Equipment Management (LEM) database. (This statement may be selected only if datasheets are completed electronically at a UL facility)



Project No. 07CA12344

File E41791

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

INSTRUCTIONS (to be completed by engineering)

Model number (for testing): **1934.** .

Models represented: **Serie 193.** .

Sample Tag Number: **N/A**, Received Date: **2007-02-26**, Location **Riehteim.**

Rated: **14 A 125-250 Vac, 1/3 HP 125 Vac, 1 HP 250 Vac** Frequency (Hz) **50.**

Switch Type **rocker** (toggle, micro, rotary, rocker, slider ... other)

Temperature ambient rating **65 °C.**

Voltage to ground **250 Vac** (120 or 240, 250 etc.)

Terminals **quick-connect 6,3 mm** (solder, quick-connect, screw, push-in, etc.)

Conductor size **14 AWG,**

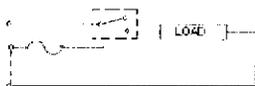
Conductor type **ST**

[(S)solid , (ST)stranded or  
(SD)solder dipped stranded]

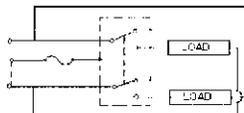
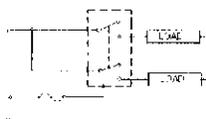
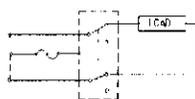
Wire Sizes for Temperature Test		
Test current, A	Wire(AWG)	Size (mm)
0.0 - 6	18	(0.82)
6.1 - 10	16	(1.3)
10.1 - 15	14	(2.1)
15.1 - 20	12	(3.3)
20.1 - 30	10	(5.3)
30.1 - 45	8	(8.4)
45.1 - 60	6	(13.3)

Test Circuit **D1.** (A, B, C or D1)

CIRCUIT A (Single Pole)



CIRCUIT B (Double Pole)



CIRCUIT C (Per Pole, Same Polarity)

CIRCUIT D1 (Per Pole, Opposite Polarity) TV

Project No. 07CA 12344

File R41791

Page 6

Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

INSTRUCTIONS (continued - to be completed by engineering)

The tested switches incorporate the following plastic material:

Switch part	Generic material type	Material designation	Manufacturer
Body, Socket, Rocker	PA	Ultranid A3K	BASF
Actuator 1934	PC	Makrolon 2805	Bayer

NOTE:

Contacts Normally Open (NO) and Normally Closed (NC) test 3 NO and 3 NC.

The same 6 samples are used for Overload, Endurance, Temperature, and Dielectric Tests.

- [ ] These are double-pole switches were evaluated for use with per-pole, opposite polarity supply.
- [ ] Switches rated T or L are tested 6000 cycles general load and 6000 cycles lamp load.
- [ ] TV rated SW tested with lamp loads overload, endurance and 2<sup>nd</sup> endurance.

Unless otherwise specified, the switches were tested as follows:

**Switch similar as 1934.3221**

Project No. 07CA12344

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

SET #	MODEL- 1934.					
Fullout Test	(S)solid , (ST)stranded or (SD)solder dipped stranded					
30 Day Temp	Degree C					
TEST	AMPS	VOLTS	LOAD	PF	CYCLES	PP/CIRCUIT
SET # 1	MODEL- 1934.		[6] samples for each test in sequence			
Mold Stress						
Overload	17,5	250	G	0.75 - 0.8	50	/ D1
Endurance	14	250	G	0.75 - 0.8	6000	/ D1
Temperature	14	250				
Dielectric		1500				
SET # 2	MODEL- 1934.		[6] samples for each test in sequence			
Mold Stress						
(Horsepower) Overload	43,2	125	HP Overload	0.4 - 0.5	50	/ D1
SET # 3	MODEL- 1934.		[6] samples for each test in sequence			
(Horsepower) Overload	48,0	250	HP Overload	0.4 - 0.5	50	/ D1
SET # 4	MODEL- 1934.		[6] samples for each test in sequence			
Mold Stress						
Overload	48,0	250	<del>HP</del>	<del>0.75 - 0.8</del> 0.4 - 0.5	50	/ D1
Endurance	8,0	250	G	0.75 - 0.8	6000	/ D1
Temperature	8,0	250				
Dielectric		1500				

Correction:  
Choose the  
Wrong Power  
Factor & Load  
2007-04-19  
LLB

Load: G = general (PF= 0.75 -0.8), T = Tungsten Lamp, Res. = resistive (PF= 0.98 -1.0), HP Overload (PF= 0.4 -0.5)

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

(HORSEPOWER) OVERLOAD TEST:

METHOD 16A

Mount samples (subjected to Mold Stress if required) with dead metal parts connected through ground fuse (15A maximum) to the test circuit polarity considered least likely to strike to ground. Wire live parts as intended in actual service, connect specified loads to a regulated supply (open circuit voltage within 5% of test voltage specified below).

PARAMETERS

Samples: 6 (same as mold stress if required)  
Cycles: 50, Cycles per Minute (CPM) 6 - 10.  
Ratings: As described on INSTRUCTION page.

RESULTS

Model 1934., Supply Frequency 50 Hz.

MEASURED VALUES								
Sample Set #	Open Circuit Volts	Test Volts	Amps	CPM	PF	Completed Cycles	Ground Fuse Open?	Inspection ##
2	134 Vac	128 Vac	43.5 A	6	0.48	50	no	no
3	265 Vac	253 Vac	48.2 A	6	0.47	50	no	no

## Inspection requires an answer of YES or NO for: signs of wear, defect, functional electrically and mechanically.

Identify individual non-complying samples N/A

Model 1934., Supply Frequency 50 Hz.

MEASURED VALUES								
Sample Set #	Open Circuit Volts	Test Volts	Amps	CPM	PF	Completed Cycles	Ground Fuse Open?	Inspection ##
4	263 Vac	251 Vac	48.2 A	6	0.48	50	no	no

## Inspection requires an answer of YES or NO for: signs of wear, defect, functional electrically and mechanically.

Identify individual non-complying samples N/A

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

OVERLOAD TEST:

METHOD 16B

Mount samples (subjected to mold Stress if required) with dead metal parts connected through ground fuse (15A maximum) to the test circuit polarity considered least likely to strike to ground. Wire live parts as intended in actual service, connect specified loads to a regulated supply (open circuit voltage within 5% of test voltage specified below).

PARAMETERS

Samples: 6 (same as mold stress if required)  
Cycles: 50, Cycles Per Minute (CPM) 6 - 10.  
Ratings: As described on INSTRUCTION page.

Load: G = General (PF = 0.75 - 0.8)  
T = Tungsten Lamp (TV rated switch)  
Res = Resistive (PF = 0.98 - 1.0)

RESULTS

Model **1934.**, Supply Frequency **50** Hz.

MEASURED VALUES								
Sample Set #	Open Circuit Volts	Test Volts	Amps	CPM	PF	Completed Cycles	Ground Fuse Open?	Sign of wear or defect?
	257 Vac	252 Vac	17.6 A	6	0.78	50	no	no

Identify individual non-complying samples N/A

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

ENDURANCE TEST:

METHOD 17

Mount samples subjected to Overload Test with dead metal parts connected through ground fuse (15A maximum) to the test circuit polarity considered least likely to strike to ground. Wire live parts as intended in actual service, connect specified loads to a regulated supply (open circuit voltage within 5% of test voltage specified below).

PARAMETERS

Samples: 6 (same samples subjected to the Overload Test)  
Cycles: See INSTRUCTION page for number of cycles (CPM) 6 - 10.  
Ratings: As described on INSTRUCTION page (100% of rated Amps).  
For TV rating Endurance is 10,000 cycles, see 2<sup>nd</sup> (continued)  
Endurance for remaining cycles.

Load: G = General (PF = 0.75 - 0.8)  
T = Tungsten Lamp (TV rated switch)  
Res = Resistive (PF = 0.98 - 1.0)

RESULTS

Model 1934., Supply Frequency 50 Hz.

MEASURED VALUES							Ground Fuse Open?	Sign of wear or defect?
Sample Set #	Open Circuit Volts	Test Volts	Amps	CPM	PF	Completed Cycles		
1	264 Vac	257 Vac	14.1A	6	0.77	6000	no	no
4	255 Vac	251 Vac	8.1A	6	0.76	6000	no	no

Identify individual non-complying samples N/A

Project No. OTCA12544

File F41791

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

TEMPERATURE TEST:

METHOD 19

Samples subjected to Endurance Test, wire live parts as intended in actual service, connect to a supply at any convenient voltage (AC or DC) that can supply the rated test current. Test until constant temperatures are obtained (three successive readings, at 5-minute intervals, indicating no change).

PARAMETERS

Samples: 6 (same samples subjected to the Endurance Test)  
Ratings: Rated Test Amps as indicated in INSTRUCTIONS  
Ambient conditions: 10 to 40°C.  
Condition: Switches tested on a flat, horizontal nonconductive surface.  
Thermocouple Type: "J", "T" or "K", minimum 300 mm long, 28-32 AWC (0.08-0.03 mm<sup>2</sup>)  
Thermocouple Locations: Place near switch body on the plates of the wiring terminals or wire leads when no terminals are provided.  
Wire Leads: Minimum length 30 cm, see INSTRUCTIONS for diameter size

RESULTS

Model 1934.

Set # 1, Test Amps 14.1, Wire 14 AWC

Terminal No.	Maximum Temperature, °C						Note: MAXIMUM TEMPERATURE RISE 30°C
	Samples						
	1	2	3	4	5	6	
1	44	52	46	50	50	49	25
1a	—	—	—	47	49	51	24
1b	45	49	46	—	—	—	22
2	41	45	50	45	44	49	23
2a	—	—	—	45	44	43	18
2b	43	47	48	—	—	—	21
Ambient	27	27	27	27	27	27	

correction. Put a dash (-) in all blank fields.

2007-04-19

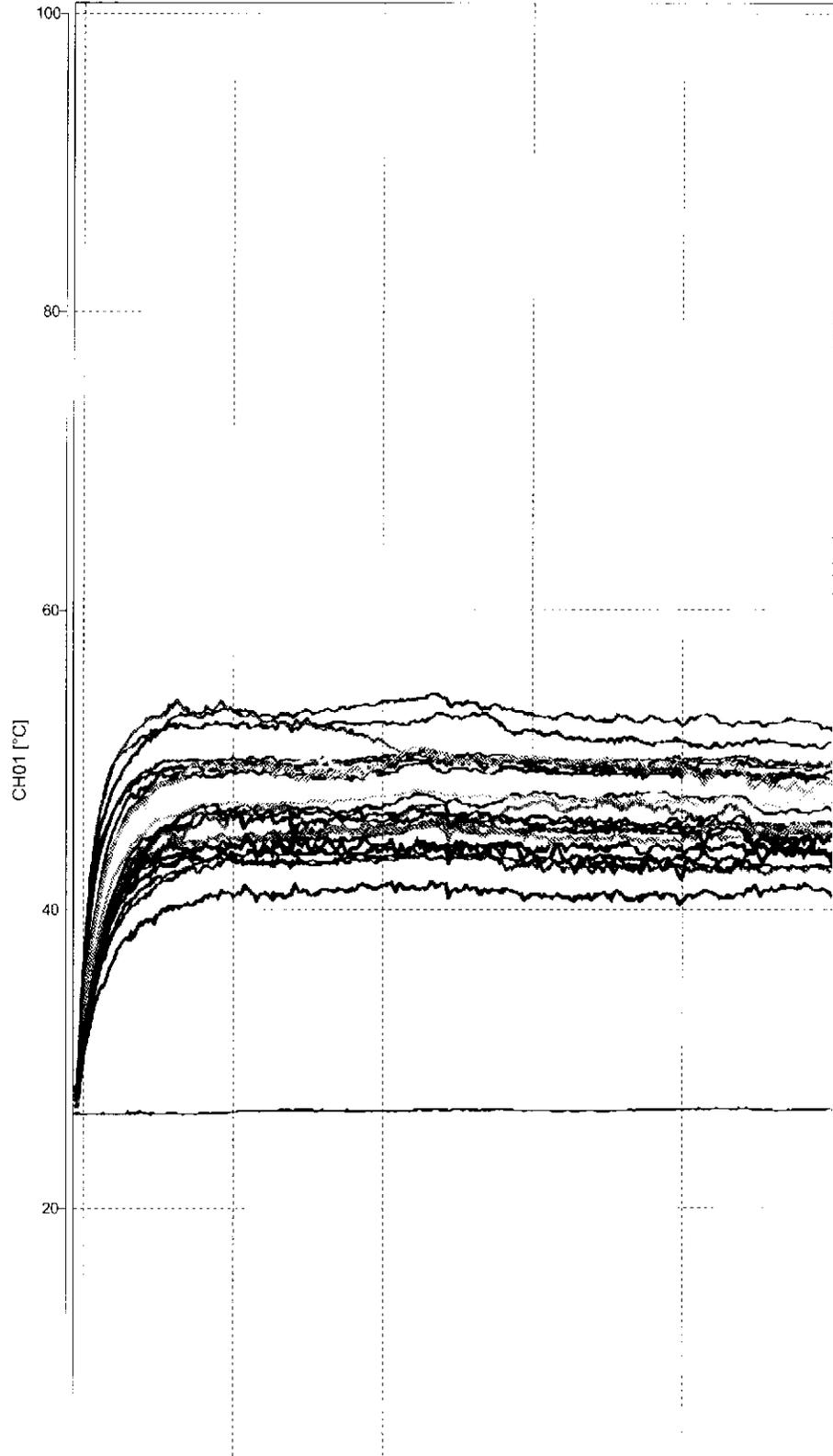
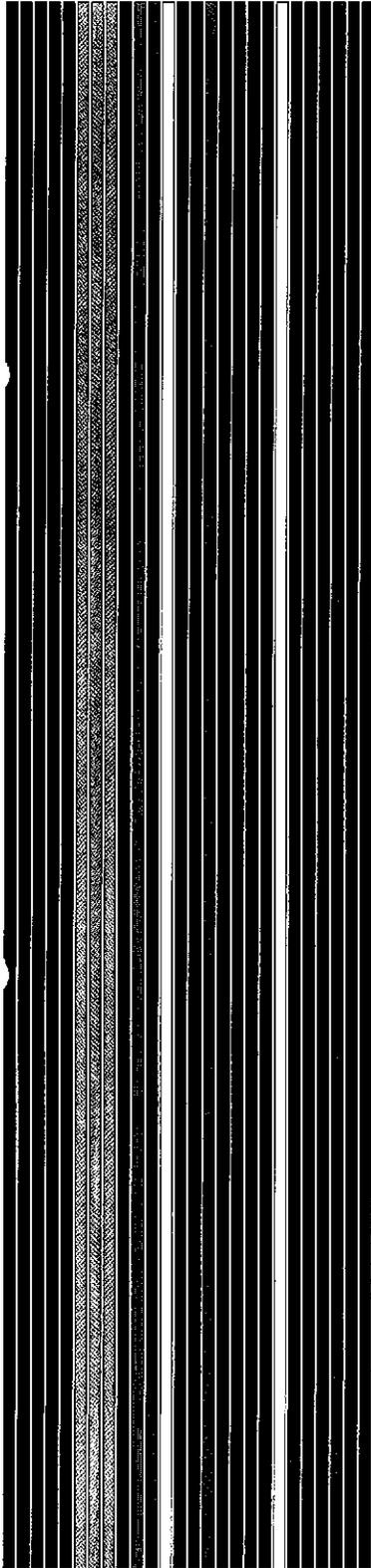
*U. B.*

Dateiname : Nr1-6\_6000\_14A.DDS  
Gerätetyp : DX200  
Serien-Nr. : S5EC05403  
Dateimeldung :  
Zeitkorrektur : Kein  
Startbed. : Manuell  
Teilungsbed. : Manuell  
Mess-Kanal : 25  
Math-Kanal : 19

Datenanzahl : 305  
Intervall : 10.000 s  
Startzeit : 2007/02/27 13:39:20.000  
Haltzeit : 2007/02/27 14:30:00.000  
Triggerzeit : 2007/02/27 14:30:00.000  
Trigger-Nr. : 304  
Schadensprüf. : Normal

Date: 2007-03-0

Druckgruppe : 1  
Druckbereich : 2007/02/27 13:39:20.000 - 2007/02/27 14:30:00.000  
Kommentar :



Set # 1 Switch No.	Terminal No.	Thermocouple
1	1	1
	1b	2
	2	3
	2b	4
2	1	5
	1b	6
	2	7
	2b	26
3	1	9
	1b	10
	2	11
	2b	12
4	1	13
	1a	14
	2	15
	2a	16
5	1	17
	1a	18
	2	19
	2a	20
6	1	21
	1a	22
	2	23
	2a	24
ambient		25

Speed: 5 min / Div

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolut[Nr]	CH01 [°C]		CH02 [°C]		CH03 [°C]		
	Min	Max	Min	Max	Min	Max	
2007/02/27 14:29:20.000[00000300]	43.6	44.0	44.4	44.9	41.2	41.4	
2007/02/27 14:29:30.000[00000301]	43.7	44.0	44.3	44.9	41.3	41.4	
2007/02/27 14:29:40.000[00000302]	43.6	44.0	44.4	44.7	41.1	41.3	
2007/02/27 14:29:50.000[00000303]	43.4	43.5	43.7	44.9	41.0	41.2	
>	2007/02/27 14:30:00.000[00000304]	42.9	43.5	44.2	45.0	40.7	41.1

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolut[Nr]	CH04 [°C]		CH05 [°C]		CH05 [°C]		
	Min	Max	Min	Max	Min	Max	
2007/02/27 14:29:20.000[00000300]	42.8	43.0	52.0	52.3	46.4	48.7	
2007/02/27 14:29:30.000[00000301]	42.8	42.9	52.1	52.1	46.2	48.6	
2007/02/27 14:29:40.000[00000302]	42.6	42.9	52.1	52.2	46.3	48.4	
2007/02/27 14:29:50.000[00000303]	42.6	42.9	52.1	52.2	46.3	48.4	
>	2007/02/27 14:30:00.000[00000304]	42.6	42.9	51.9	52.2	46.3	48.7

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolut[Nr]	CH07 [°C]		CH08 [°C]		CH09 [°C]		
	Min	Max	Min	Max	Min	Max	
2007/02/27 14:29:20.000[00000300]	44.9	45.1	47.0	47.2	45.6	45.9	
2007/02/27 14:29:30.000[00000301]	44.9	45.0	47.0	47.1	45.7	45.9	
2007/02/27 14:29:40.000[00000302]	44.5	44.9	47.0	47.1	45.7	45.8	
2007/02/27 14:29:50.000[00000303]	44.9	45.0	47.0	47.1	45.6	45.9	
>	2007/02/27 14:30:00.000[00000304]	44.5	45.0	47.0	47.3	45.7	45.8

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolut[Nr]	CH10 [°C]		CH11 [°C]		CH12 [°C]	
	Min	Max	Min	Max	Min	Max
2007/02/27 14:29:20.000[00000300]	45.5	45.8	45.6	45.9	47.3	48.1

Absolute[Nr]	CH13 [°C]		CH14 [°C]		CH15 [°C]	
	Min	Max	Min	Max	Min	Max
2007-02-27 14:29 20.000[00000300]	49.5	49.5	46.6	46.6	44.9	45.7
2007-02-27 14:29 30.000[00000301]	49.5	49.5	46.6	46.7	45.0	45.7
2007-02-27 14:29 40.000[00000302]	49.5	49.5	46.7	46.9	45.0	45.7
2007-02-27 14:29 50.000[00000303]	49.5	49.6	46.7	46.9	45.0	45.3
> 2007-02-27 14:30 00.000[00000304]	49.5	49.6	46.5	46.7	45.0	45.3

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolute[Nr]	CH15 [°C]		CH17 [°C]		CH16 [°C]	
	Min	Max	Min	Max	Min	Max
2007-02-27 14:29 20.000[00000300]	44.6	44.7	49.5	49.5	45.5	49.0
2007-02-27 14:29 30.000[00000301]	44.5	44.6	49.5	49.6	45.5	49.0
2007-02-27 14:29 40.000[00000302]	44.6	44.6	49.4	49.5	49.0	49.1
2007-02-27 14:29 50.000[00000303]	44.5	44.7	49.5	49.5	49.1	49.1
> 2007-02-27 14:30 00.000[00000304]	44.5	44.5	49.5	49.7	49.1	49.1

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolute[Nr]	CH19 [°C]		CH20 [°C]		CH21 [°C]	
	Min	Max	Min	Max	Min	Max
2007-02-27 14:29 20.000[00000300]	43.7	43.9	44.2	44.4	45.6	46.0
2007-02-27 14:29 30.000[00000301]	43.8	44.0	44.2	44.4	45.5	46.0
2007-02-27 14:29 40.000[00000302]	43.9	43.8	44.3	44.4	45.6	46.0
2007-02-27 14:29 50.000[00000303]	43.5	43.8	44.4	44.4	45.6	46.0
> 2007-02-27 14:30 00.000[00000304]	43.5	43.8	44.3	44.4	45.5	46.0

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolute[Nr]	CH22 [°C]		CH23 [°C]		CH24 [°C]	
	Min	Max	Min	Max	Min	Max
2007-02-27 14:29 20.000[00000300]	50.7	50.8	42.8	42.9	42.5	42.7
2007-02-27 14:29 30.000[00000301]	50.7	50.9	42.8	42.9	42.6	42.8
2007-02-27 14:29 40.000[00000302]	50.9	51.1	42.7	42.8	42.8	42.7
2007-02-27 14:29 50.000[00000303]	51.1	51.2	42.7	42.8	42.4	42.7
> 2007-02-27 14:30 00.000[00000304]	51.1	51.2	42.6	42.7	42.4	42.6

Datenliste [ Nr1-6\_6000\_14A DDS ]

Absolute[Nr]	CH25 [°C]		CH26 [°C]	
	Min	Max	Min	Max
2007-02-27 14:29 20.000[00000300]	26.5	26.6	47.0	47.2
2007-02-27 14:29 30.000[00000301]	26.5	26.6	47.0	47.1
2007-02-27 14:29 40.000[00000302]	26.5	26.6	47.0	47.1
2007-02-27 14:29 50.000[00000303]	26.6	26.6	47.0	47.1
> 2007-02-27 14:30 00.000[00000304]	26.6	26.6	47.0	47.0

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Tested by: \_\_\_\_\_

Date 2007-02-16

Printed Name

Signature

TEMPERATURE TEST: (continued)

RESULTS

Model 1934..

Set # 4, Test Amps 8.1, Wire 16 AWG

Terminal No.	Maximum Temperature, °C						Note: MAXIMUM TEMPERATURE RISE 30°C
	Samples						
	1	2	3	4	5	6	
1	42	43	34	40	40	35	16
1a	-	-	-	43	43	52	25
1b	48	48	36	-	-	-	21
2	41	40	35	37	43	42	16
2a	-	-	-	38	47	35	20
2b	44	46	36	-	-	-	17
Ambient:	27	27	27	27	27	27	

Correction: Put a dash (-) in all blank fields.

2007-04-19

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File: EU17S1

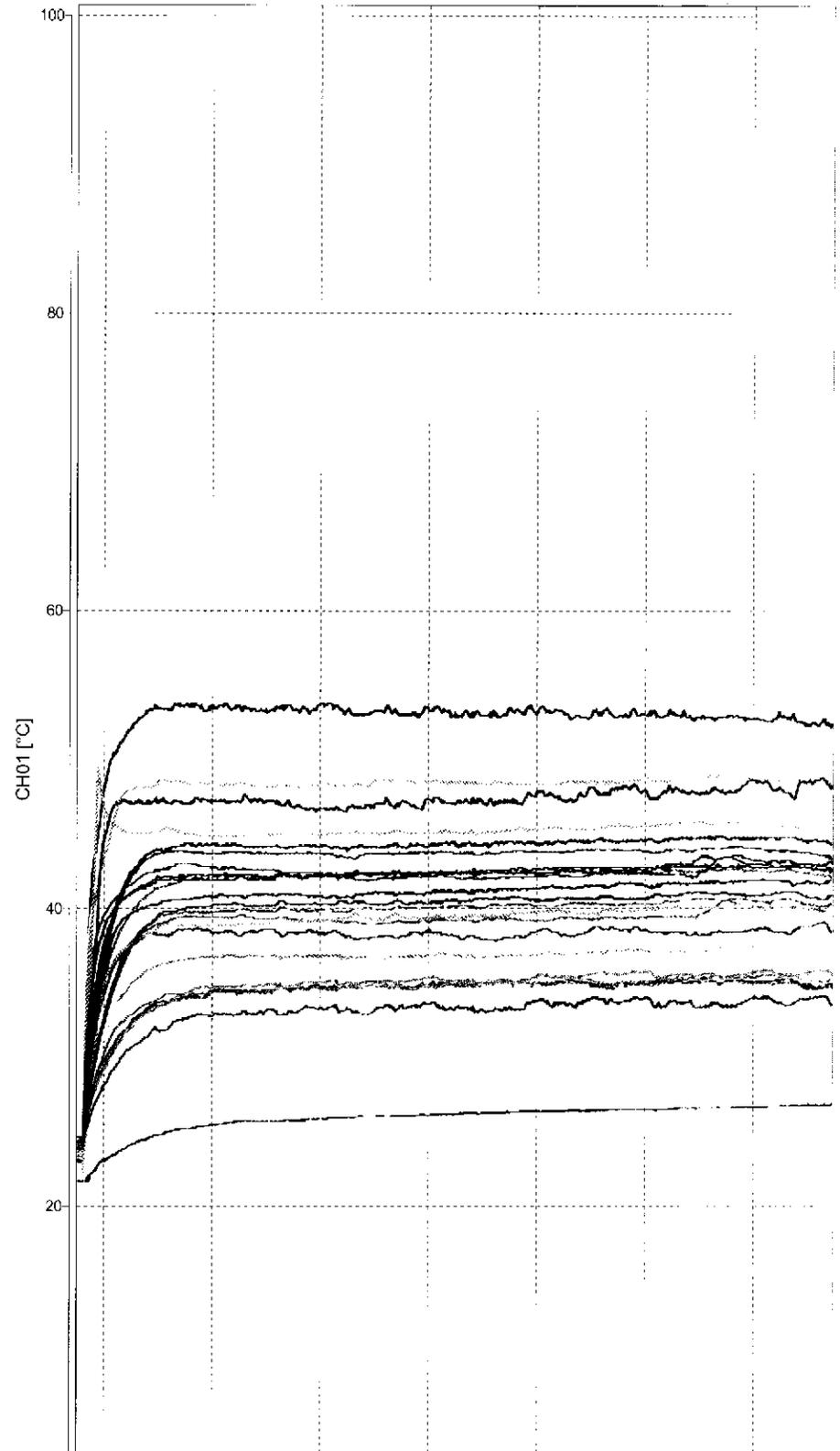
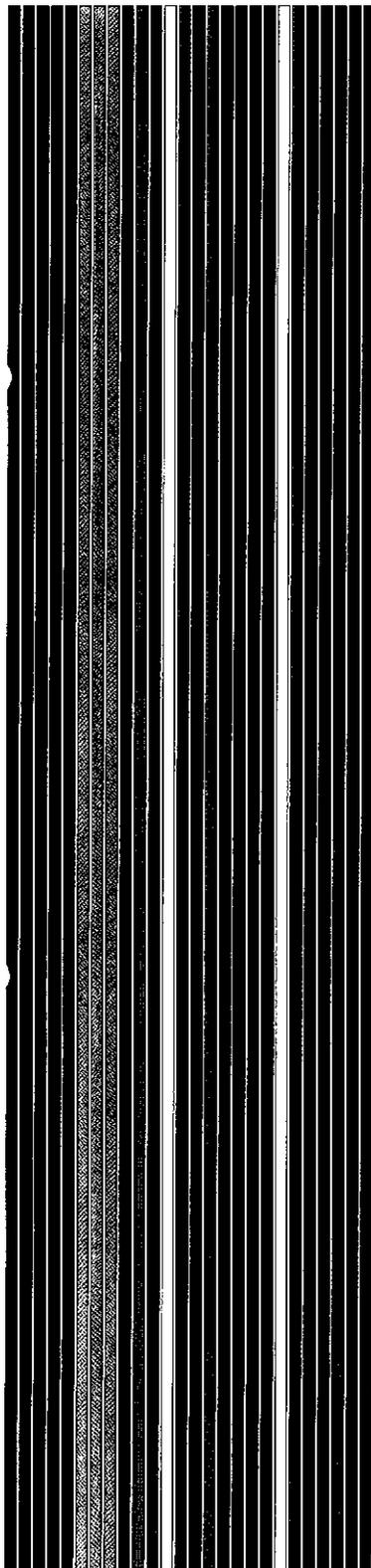
Page: 12a

Date: 2007-03-06

Dateiname : Nr19-24\_6000-8A-Full-Load (1).DDS.Jdx  
Gerätetyp : DX200  
Serien-Nr. : S5EC05403  
Dateimeldung :  
Zeitkorrektur : Kein  
Startbed. : Manuell  
Teilungsbed. : Manuell  
Mess-Kanal : 25  
Math-Kanal : 19

Datenanzahl : 420  
Intervall : 10.000 s  
Startzeit : 2007/03/07 14:07:30.000  
Haltzeit : 2007/03/07 15:17:20.000  
Triggerzeit : 2007/03/07 15:07:20.000  
Trigger-Nr. : 359  
Schadensprüf. : Normal

Druckgruppe : 1  
Druckbereich : 2007/03/07 14:07:30.000 - 2007/03/07 15:17:20.000  
Kommentar :



Set # 4	Terminal No.	Thermocouple
Switch No.		
19	1	1
	1b	2
	2	3
	2b	4
20	1	5
	1b	6
	2	7
	2b	26
21	1	9
	1b	10
	2	11
	2b	12
22	1	13
	1a	14
	2	15
	2a	16
23	1	17
	1a	18
	2	19
	2a	20
24	1	21
	1a	22
	2	23
	2a	24
ambient		25

**Speed: 5 min / Div**

Datenliste [ Nr19-24\_6000-8A-Full-Load (1).DDS.idx ]

Absolute Zeit[Nr.]	CH01 [°C]		CH02 [°C]		CH03 [°C]	
	Min	Max	Min	Max	Min	Max
2007/03/07 15:16:40.000[00000415]	41.7	41.8	42.2	42.7	40.6	40.6
2007/03/07 15:16:50.000[00000416]	41.7	41.9	42.3	42.8	40.6	40.7
2007/03/07 15:17:00.000[00000417]	41.7	41.9	42.3	42.4	40.6	40.9
2007/03/07 15:17:10.000[00000418]	41.9	41.9	42.0	42.3	40.6	40.9
> 2007/03/07 15:17:20.000[00000419]	41.9	41.9	42.0	42.2	40.6	40.9

Datenliste [ Nr19-24\_6000-8A-Full-Load (1).DDS.idx ]

Absolute Zeit[Nr.]	CH04 [°C]		CH05 [°C]		CH06 [°C]	
	Min	Max	Min	Max	Min	Max
2007/03/07 15:16:40.000[00000415]	44.5	44.6	42.6	42.6	46.6	48.6
2007/03/07 15:16:50.000[00000416]	44.4	44.6	42.6	42.8	46.6	48.7
2007/03/07 15:17:00.000[00000417]	44.4	44.6	42.6	42.9	46.6	48.6
2007/03/07 15:17:10.000[00000418]	44.3	44.4	42.4	42.8	46.3	48.6
> 2007/03/07 15:17:20.000[00000419]	44.2	44.4	42.5	42.6	46.3	48.4

Datenliste [ Nr19-24\_6000-8A-Full-Load (1).DDS.idx ]

Absolute Zeit[Nr.]	CH07 [°C]		CH08 [°C]		CH09 [°C]	
	Min	Max	Min	Max	Min	Max
2007/03/07 15:16:40.000[00000415]	39.6	39.7	45.3	45.4	34.1	34.1
2007/03/07 15:16:50.000[00000416]	39.7	40.0	45.3	45.4	34.0	34.1
2007/03/07 15:17:00.000[00000417]	39.9	40.0	45.4	45.5	33.5	34.1
2007/03/07 15:17:10.000[00000418]	39.6	40.0	45.4	45.5	33.5	33.8
> 2007/03/07 15:17:20.000[00000419]	39.6	40.0	45.4	45.5	33.5	33.9

Datenliste [ Nr19-24\_6000-8A-Full-Load (1).DDS.idx ]

Absolute Zeit[Nr.]	CH10 [°C]		CH11 [°C]		CH12 [°C]	
	Min	Max	Min	Max	Min	Max
2007/03/07 15:16:40.000[00000415]	35.8	35.9	34.7	34.9	25.7	25.8
2007/03/07 15:16:50.000[00000416]	35.8	35.9	34.7	34.9	25.7	25.9

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Proj. 12c  
Dok. 2007-0

Datenliste [ Nr19-24\_6000-8A-Full-Load (1),DDS Idx ]

Absolute Zeit[Nr.]	CH13 [°C]		CH14 [°C]		CH15 [°C]	
	Min	Max	Min	Max	Min	Max
2007-03-07 15:16:40.000[00000415]	39.7	39.8	42.2	42.3	37.3	37.4
2007-03-07 15:16:50.000[00000416]	39.7	39.8	42.7	42.8	37.4	37.4
2007-03-07 15:17:00.000[00000417]	39.8	39.9	42.8	42.9	37.3	37.4
2007-03-07 15:17:10.000[00000418]	39.7	39.8	42.4	42.7	37.0	37.3
>	39.7	39.8	42.4	42.6	37.1	37.7

Datenliste [ Nr19-24\_6000-8A-Full-Load (1),DDS Idx ]

Absolute Zeit[Nr.]	CH16 [°C]		CH17 [°C]		CH18 [°C]	
	Min	Max	Min	Max	Min	Max
2007-03-07 15:16:40.000[00000415]	38.9	39.1	40.1	40.2	43.5	43.6
2007-03-07 15:16:50.000[00000416]	38.9	39.0	40.1	40.2	43.5	43.6
2007-03-07 15:17:00.000[00000417]	38.6	38.9	40.1	40.3	43.4	43.6
2007-03-07 15:17:10.000[00000418]	38.4	38.6	40.3	40.4	43.3	43.6
>	38.4	38.4	40.2	40.3	43.3	43.4

Datenliste [ Nr19-24\_6000-8A-Full-Load (1),DDS Idx ]

Absolute Zeit[Nr.]	CH19 [°C]		CH20 [°C]		CH21 [°C]	
	Min	Max	Min	Max	Min	Max
2007-03-07 15:16:40.000[00000415]	42.9	43.0	47.2	47.4	35.0	35.1
2007-03-07 15:16:50.000[00000416]	42.9	43.0	47.2	47.3	35.0	35.1
2007-03-07 15:17:00.000[00000417]	43.0	43.2	47.1	47.2	35.1	35.2
2007-03-07 15:17:10.000[00000418]	43.2	43.2	47.1	47.2	35.1	35.3
>	43.3	43.2	47.0	47.2	35.1	35.3

Datenliste [ Nr19-24\_6000-8A-Full-Load (1),DDS Idx ]

Absolute Zeit[Nr.]	CH22 [°C]		CH23 [°C]		CH24 [°C]	
	Min	Max	Min	Max	Min	Max
2007-03-07 15:16:40.000[00000415]	26.7	26.8	52.3	52.5	42.1	42.2
2007-03-07 15:16:50.000[00000416]	26.7	26.8	52.3	52.5	42.1	42.2
2007-03-07 15:17:00.000[00000417]	26.7	26.8	52.3	52.5	42.2	42.3
2007-03-07 15:17:10.000[00000418]	26.7	26.8	52.1	52.4	42.0	42.2
>	26.7	26.8	52.2	52.4	41.9	42.1

Datenliste [ Nr19-24\_6000-8A-Full-Load (1),DDS Idx ]

Absolute Zeit[Nr.]	CH25 [°C]		CH26 [°C]	
	Min	Max	Min	Max
2007-03-07 15:16:40.000[00000415]	34.7	34.8	45.3	45.4
2007-03-07 15:16:50.000[00000416]	34.6	35.0	45.3	45.4
2007-03-07 15:17:00.000[00000417]	34.9	35.1	45.4	45.5
2007-03-07 15:17:10.000[00000418]	35.0	35.2	45.4	45.5
>	34.7	35.2	45.4	45.5





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Tested by: \_\_\_\_\_  
Printed Name Signature

Date 2007-02-26

HUMIDITY CONDITIONING AND DIELECTRIC WITHSTAND TEST:  
(spacings test)

METHOD 20.2

Switches with spacings evaluated by testing (after the endurance test) place samples in the chamber for conditioning as described below. Immediately after removing the samples from the chamber, mount on sheet metal not less than 1/16 in. thick to simulate the most severe normal conditions of spacings. Perform the Dielectric test as described below.

PARAMETERS

Samples: 6 (same samples subjected to the Endurance Test)  
Environmental conditioning: 48 hours at 32 ± 1°C, relative humidity 95-100%  
Dielectric Voltage: 1000 - 20V Immediately following humidity conditioning.

RESULTS

Model **1934**. Chamber Temp. 32.0 °C , 96 % Humidity

Test equipment was checked before and after the test by observing alarm operation with:  leads connected together  a checking resistor

- A. Between live parts and dead-metal parts including the mounting surface.
- B. Between live parts of opposite polarity. - (Multiple pole switch)
- C. Across the contacts, switch in the "open" position. - (TV rated)

Sample Set# 1	Dielectric Potential	Was there any indication of breakdown?		
Model 1934.	<u>1500</u>	A) <del>Yes</del>	<u>No</u>	<del>N/A</del>
	<u>1500</u>	B) <del>Yes</del>	<u>No</u>	<del>N/A</del>
	<u>1500</u>	C) <del>Yes</del>	<u>No</u>	<del>N/A</del>

Sample Set# 4	Dielectric Potential	Was there any indication of breakdown?		
Model 1934.	<u>1500</u>	A) <del>Yes</del>	<u>No</u>	<del>N/A</del>
	<u>1500</u>	B) <del>Yes</del>	<u>No</u>	<del>N/A</del>
	<u>1500</u>	C) <del>Yes</del>	<u>No</u>	<del>N/A</del>

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Tested by: \_\_\_\_\_

Date 2007-02-26

Printed Name

Signature

END OF DATASHEET PACKAGE. THIS PAGE INTENTIONALLY LEFT BLANK

Compliance

Review

Conducted by: Giuliano Marroco

Printed Name



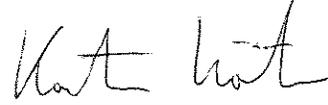
Signature

Date 2007-04-19

## CONSTRUCTION COMPLIANCE REVIEW RECORD

Completed Construction Compliance Review was Reviewed and accepted by: Karsten Köster

(Qualified Reviewer) Printed Name



Signature

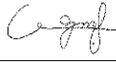
Sample Identification - see Datasheets

Measurement Instrument Information -

Inst. ID No.	Instrument Type	Function/Range	Last Cal. Date	Next Cal. Date
PAQ-002	Caliper	0-150 mm	Jan 05, 2007	Jan, 2008

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.
PAQ-002	Digimess, 100.174BL.



## CONSTRUCTION COMPLIANCE REVIEW:

The sample was reviewed for compliance with the construction requirements in the following Standard and compliance with applicable construction requirements is noted below.

Standard CSA C22.2 No. 55, Special Use Switches Edition 1986/2003

Clause/Par. Reference and Construction Requirement	Comply			COMMENTS/MEASUREMENTS	INST. ID NO.
	YES	NO	N/A		
4.1 General	X				
4.2 Insulating Materials - Television Switches					
4.2.1 Insulating materials used as part of the switch enclosure			X		
4.2.2 Arc-tracking requirements for contacts that are mounted directly			X		
4.2.3 Flammability classification			X		
4.2.4 Actuator made of insulating material			X		
4.3 Enclosures					
4.3.1 Enclosures for switches			X		
4.3.2 Thickness of metal enclosures for switches			X		
4.3.3 Environmental considerations			X		
4.3.4 Open areas in a switch enclosure			X		
4.4 Nipples					
4.4.1 Nipples through which wires may pass			X		
4.4.2 Nipples not integral to the body of the switch			X		
4.4.3 Female nipples			X		

Compliance

Review

Conducted by: Giuliano MarrocoDate 2007-04-19

Printed Name

Signature

Clause/Par. Reference and Construction Requirement	Comply			COMMENTS/MEASUREMENTS	INST. ID NO.
	YES	NO	N/A		
4.4.4 Switches intended for attachment to rigid conduit			X		
4.5 Linings					
4.5.1 Enclosure wholly or partly made of metal			X		
4.5.2 Switches having moulded covers			X		
4.6 Bushings and Strain Reliefs for Through-Cord and Pendent Type Switches					
4.6.1 Diameter requirements of cord inlet holes in switches			X		
4.6.2 Cord inlet holes in switches having metal enclosures			X		
4.6.3 Threaded insulating bushings			X		
4.6.4 Strain relief			X		
4.6.5 Switches or other than heating-pad type			X		
4.7 Base and Bodies	X				
4.8 Protection (Mounting)			X		
4.9 Sealing					
4.9.1 Live parts (recess)			X		
4.9.2 Depth or thickness of sealing compound over a nut or screw head			X		
4.10 Current-Carrying Parts					
4.10.1 Material, strength, rigidity, current-carrying capacity of current-carrying parts	X				
4.10.2 Copper or copper alloy	X				
4.10.3 Judging of switches	X				
4.10.4 Soldered connections	X				
4.10.5 Stainless steel			X		

Only those products bearing the UL Mark should be considered as being covered by UL.



Clause/Par. Reference and Construction Requirement	Comply			COMMENTS/MEASUREMENTS	INST. ID NO.
	YES	NO	N/A		
4.11 Terminal Parts and Leads					
4.11.1 Connection of conductors	X				
4.11.2 Terminal screws			X		
4.11.3 Terminals of special type			X		
4.11.4 Wiring terminal screw thread into metal			X		
4.11.5 Wiring leads provided on a switch			X		
4.11.6 Switches intended for mounting in luminaire canopies			X		
4.11.7 Switches rated less than 30 A terminal ID	X				
4.11.8 Copper or copper ally terminal parts	X				
4.12 Air Gaps and Creepage Distances					
4.12.1 Requirements	X			For all models: Spacings through air (8.0 mm) and over surface (7.4 mm) between an uninsulated live part and a dead metal part.	PAQ-002
4.12.2 Television switch including one or more poles with no TV rating			X		
4.13 Actuating Members					
4.13.1 Material	X				
4.13.2 Actuating member or other than insulation material			X		
4.14 Assembly	X				
4.14.1 Capability of being readily wired			X		
4.14.2 Loosing or backing or screws			X		



Clause/Par. Reference and Construction Requirement	Comply			COMMENTS/MEASUREMENTS	INST. ID NO.
	YES	NO	N/A		
4.14.3 Screws used in the assembly of switches			X		
4.14.4 Chains used on switches			X		
4.15 Ratings					
4.15.1 Switches shall be rated in volts	X				
4.15.2 Steady-state current rating			X		
4.15.3 Tungsten rating of switches			X		
4.15.4 Rating performance testing results	X				
5.1 Markings					
5.1.1.a Name identifier	X				
5.1.1.b Electrical rating	X				
5.2.1 Tungsten "T" ac & dc			X		
5.2.2 Tungsten "L" ac only			X		
5.3 Mark for "ac" "~"	X				
5.4.1.a TV switch "TV"			X		
5.4.1.b Steady state Amps			X		
5.4.2 TV rated Voltage			X		
5.4.3 Multipole one rating			X		
5.1.1 Multipole Multi rating			X		