File E76343
Project 88ME40870

Issued: 1988-11-07
Revised: 2005-06-27

REPORT

on

COMPONENT - SWITCHES, INDUSTRIAL CONTROL

Tripus Systems GmbH **– Und Steuergeraete**
Am Hohen Rain 2
89347 BUBESHEIM, Germany

D E S C R I P T I O N

PRODUCT COVERED:

USR, CNR - Component - Industrial Control Switches, Relay Types TP3250BV08, TP3250BV10, TP3250BV16 and TP3250URBV39. Type TP3250 may be followed by suffixes.

General - These devices are magnetically operated relays that are provided in the following configurations.

Configurations
Four Normally open only
Three Normally open only
Two Normally open only
One Normally open only
Three Normally open - one normally closed.
Two Normally open - one normally closed.
One Normally open - one normally closed
Two Normally open - Two normally closed.
One Normally open - Two Normally closed.
Two Normally closed only.
One Normally closed only.
For Configeration marking, refer to Ill. 1.

Cat. No. TP3250BV08 is identical to Cat. No. TP3250BV10 except that it is provided with a metal mounting bracket.

These relays are intended for use in Industrial Control Equipment where the acceptability of the combination has been determined by Underwriters Laboratories Inc.

RATINGS:

All ratings are per pole, opposite polarity between poles.

Volts	1-phase hp	3-phase hp
120	1	2
240	1-1/2	5

20A Resistive, 120 V ac
16A General use, 120 V ac
16A Resistive, 250 V ac
10A General use, 240 V ac
16A, 28 V dc
3A, 50 V dc

Coil - 24 V dc, 120 V ac, 230 V ac, 240 V ac.

ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

CNR - Indicates Investigated To Canadian National Standard(s) C22.2 No. 14-M95.

Note: CNR = Canadian National Standards - Recognized.
USR = United States Standards - Recognized.

Use - For use only in (or with) complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

1. This Component has been judged on the basis of the Standard for Industrial Control Equipment (UL 508, Table 47.1 which would cover the Component itself is submitted for unrestricted use).

2. The devices should be mounted in an enclosure having adequate strength, thickness and in the intended manner with adequate spacings required in the end product.

3. The devices should be used within their marked ratings.

4. These devices are suitable for factory wiring only.

5. The spacings were evaluated for Pollution Degree 3 and Over-voltage Category III in accordance to UL840 and CSA C22.2 No. 14-13.

CONSTRUCTION DETAILS:

Corrosion Protection - The product shall be constructed of corrosion resistant material, or all surfaces of the parts shall be either painted or plated unless otherwise specified.

Tolerances - Unless specified, all dimensions are nominal.

Marking - Pressure sensitive label securely cemented on device, contains Manufacturer's name or trademark and type or catalog number. Recognized Component marking may be provided. Electrical ratings are optional.

*

Spacings - The following spacings are provided throughout these devices

The spacings have been evaluated according to the UL Standard UL 840 "Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment" and CAN/CSA 22.2 No 14.

Pollution Degree: 3 (device marked for use in Pollution Degree 3)

Overvoltage Category: OVIII

Material Group: Material Group III(a)

Clearances – Minimum acceptable clearances according to UL 840, table 8.1 and CAN/CSA 22.2 No 14 Table 55:

Phase-to-ground rated system voltage, Overvoltage Category III	Clearance, mm Pollution degree 3
Max. 300V	3

Creepages – Minimum acceptable creepage distances according to UL 840, table 9.1:

Operating voltage in Volts ac, dc or rms	Creepage, mm Pollution degree 3, Material Group IIIa
Max. 250V	4

Creepages – Minimum acceptable creepage distances according to CAN/CSA 22.2 No 14 Table 35:

Operating voltage in Volts ac, dc or rms	Creepage, mm Pollution degree 3, Material Group III
Max. 250V	4 (interpolated)

RELAY TYPE TP3250BV10
(REPRESENTS ALL TP3250 DEVICES) FIG. 1 (M88-20800)

General - These devices may be provided as 4NO, 3NO + 1NC, 2NO, 2NO + 2NC, 3NO, 1NO, 2NO + 1NC, 1NO + 2NC, 2NC, 1NC, 1NO + 1NC.

*1. Housing - Recognized Component Plastic (QMFZ2) Ultramid Type A3X1G7 manufactured by BASF (E41871), (rated V-0, 105°C), or Arnite Type TV4-260 manufactured by AKZO Plastics. Overall dimensions **approx.. 44** mm by **32** mm by **21** mm, **min thickness** 1.0 mm**at direct support of live parts.** Provided with slots and grooves as shown.

Alternate – Same as above except, Type A3X2G7, BASF SE (E41871), (rated V-0, 115°C).

Alternate – Same as above except, Type 66 GF 25 FR 5 A(f2), A SCHULMAN GMBH (E86615), (rated V-0, 130°C).

Alternate – Same as above except, R/C (QMFZ2/8.E116324) – Cat. No. Radiflam A RV250 AF, manufactured by Radicinovacips, rated HWI 1, HAI 0, CTI 1, RTIel. 100°C, Flame Class V-0.

2. Stationary Terminal and Contacts - Silver plated copper alloy, overall dimensions 23.9 by 7.7 by 0.7 mm thick. Provided with 3.2 mm contact of same material. Contact measures 0.35 mm thick.

*3. Contact Slide - Recognized Component Plastic (QMFZ2) Ultramid Type A3X1G7 manufactured by BASF. Min. **thickness 1 mm.**

Alternate - Recognized Component Plastic (QMFZ2) Type 802 manufactured by Phoenix AG.

Alternate – Same as above except, Type A3X2G7, BASF SE (E41871), (rated V-0, 115°C).

Alternate – Same as above except, Type 66 GF 25 FR 5 A(f2), A SCHULMAN GMBH (rated V-0, 130°C) (E86615).

Alternate – Same as above except, Type UPA 63, Raschig GMBH (rated V-0, 105°C) (E75850).

Alternate - Same as above except, Type “RALUPOL” UP 4385, Raschig GMBH (rated V-0, 170°C) (E75850).

Alternate – Same as above except, R/C (QMFZ2/8.E116324) – Cat. No. Radiflam A RV250 AF, manufactured by Radicinovacips, rated HWI 1, HAI 0, CTI 1, RTIel. 100°C, Flame Class V-0.

*

4. Movable Contact Arm and Contact - Arm made of copper, measures 14.1 mm by 3.5 mm by 0.65 mm thick. Provided with two silver contacts measuring 3.5 mm by 3 mm by 0.35 mm thick welded to arm.

Alternate – Same as above except, suitable for printed circuit board mounting. See Fig. 2 for details.

*5. Case - Recognized Component Plastic (QMFZ2) Ultramid Type A3X1G7 manufactured by BASF Plastics. Overall dimensions **approx.** 42 mm by 23.5 mm by 14 mm**, min. thickness 1.6 mm at direct support of live parts.** Provided with barriers and cavities.

Alternate – Same as above except, Type A3X2G7, BASF SE (E41871), (rated V-0, 115°C),.

Alternate – Same as above except, Type 66 GF 25 FR 5 A(f2), A SCHULMAN GMBH (E86615), (rated V-0, 130°C).

Alternate – Same as above except, R/C (QMFZ2/8.E116324) – Cat. No. Radiflam A RV250 AF, manufactured by Radicinovacips, rated HWI 1, HAI 0, CTI 1, RTIel. 100°C, Flame Class V-0.

6. Pressure Spring - Spring steel, measures 4.5 mm long by 4.1 mm dia. Wire dia. 0.3 mm.

7. Draw Spring - Spring steel, measures 18.5 mm long by 2.95 mm dia. Wire dia 0.35 mm.

8. Clamp - Spring steel, U-shaped. Measures 45 mm by 14 mm by 1.1. mm dia.

9. Core (AC/DC) - Soft iron, 10.5 mm dia, 27 mm long.

10. Back Plate - Iron, measures 21 mm by 20 mm by 1.5 mm thick.

11. Cap - Recognized Component Plastic (QMFZ2) BASF (E36632), Ultramid Type A3X2G5 or AKZO Plastics, Arnite Type TV4-260. Overall dimensions 19 mm by 5.5 mm by 5 mm, 2.5 mm thick

Alternate – Same as above except, Type 66 GF 25 FR 5 A(f2), A SCHULMAN GMBH (E86615), (rated V-0, 130°C).

Alternate – Same as above except, Type A3X2G7, BASF SE (E41871), (rated V-0, 115°C).

Alternate – Same as above except, R/C (QMFZ2/8.E116324) – Cat. No. Radiflam A RV250 AF, manufactured by Radicinovacips, rated HWI 1, HAI 0, CTI 1, RTIel. 100°C, Flame Class V-0.

12. Switching Bridge - Nickel plated iron, measures 38.7 mm by 11.1 mm by 1 mm thick. Slightly bent at center.

*

13. Mounting Bracket - (Not shown) - Metal, provided with Type E3250BV08 only.

*14. Bobbin - R/C Plastic (QMFZ2) Arnite Type TV4-260S manufactured by DSM rated 140°C. Overall dimensions **approx.** 48.3 mm by 24.3 mm by 23.5 mm, **min. thickness 1 mm.**

Alternate material - Recognized Component Plastic (QMFZ2) designated CRASTIN, manufactured by E I DUPONT DE NEMOURS & CO INC, Cat. No. SK645FR rated 140°C, min 1 mm thick.

Alternate – Same as above except, R/C (QMFZ2/8.E45329) – Cat. No. Valox DR48V, manufactured by Sabic Innovative Plastics BV, rated HWI 3, HAI 0, CTI 3, RTIel. 120, Flame Class V-0.

*15. Yoke - Iron, overall dimensions 40 mm by 32 mm by 27 mm. 2.5 mm thick.

*16. Coil Banding - R/C Insulating Tape (OANZ2) manufactured by Beiersdorf AG rated min 130°C. Wrapped around coil winding. Provides insulation between coil wire and stationary armature.

Alternate material - R/C insulating Tape (OANZ2), manufactured by Klebetechnik GmbH Cat. No. CMC1810 rated 130°C.

Alternate material – R/C insulating Tape (OANZ2), manufactured by 3M, Cat. No. 1350F-1 and 1350F-2 rated 130°.

Alternate – Any R/C (OANZ2), polyester film insulating tape, rated minimum 125°C.

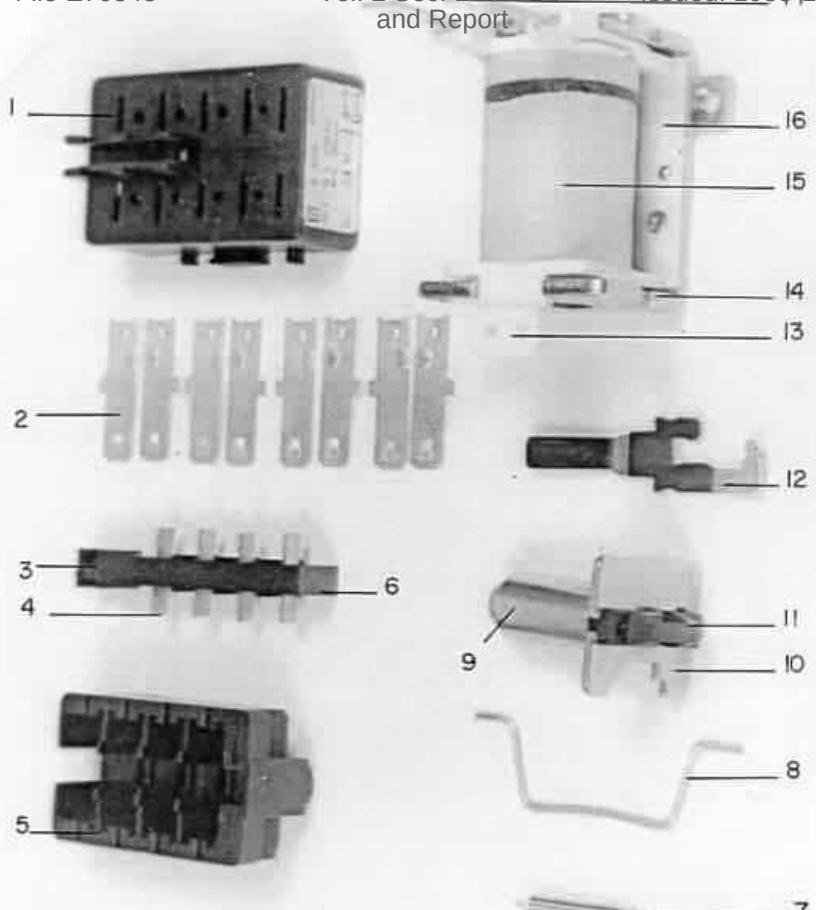
Coil Winding - R/C Magnet Wire (OBMW2) Polysol Type 155 manufactured by Elektrisola. Provided on random wound magnet wire.

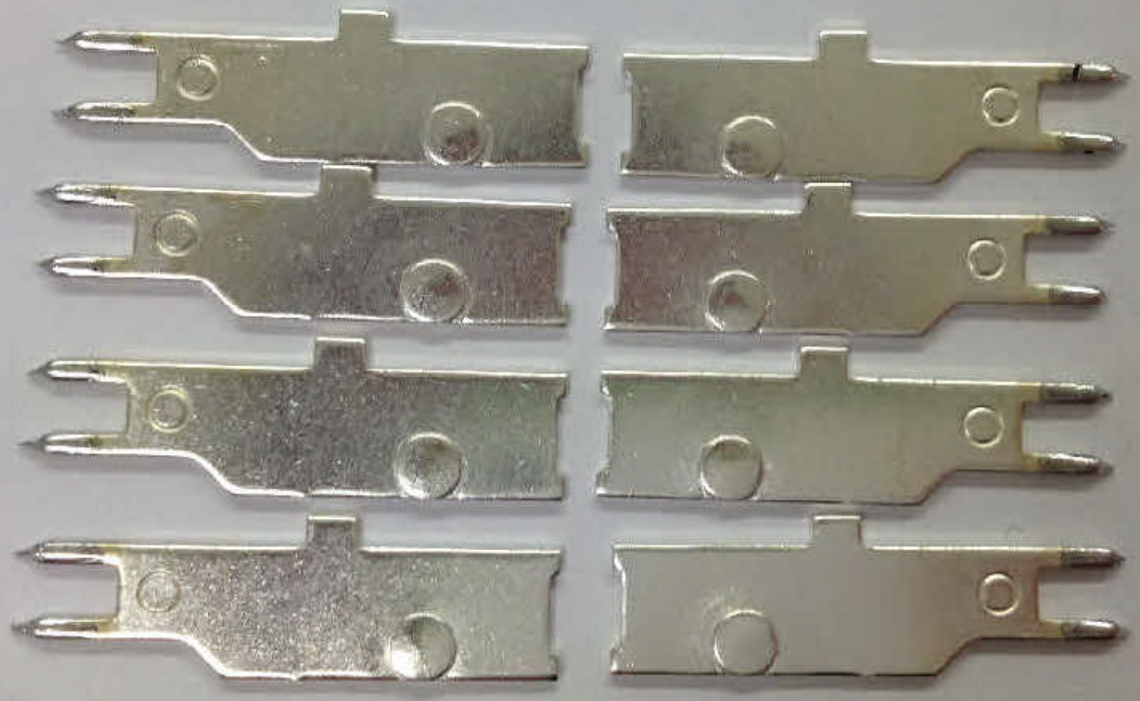
Alternate - R/C Magnet Wire (OBMW2) Polysol Type 155 manufactured by Albert Wehde. Provided on random wound magnet wire.

Alternate – Any R/C (OBMW2), magnet wire, ANSI Grade MW75 or MW79, rated minimum 130°C.

*17. Insulating Plate - Polyester (Hostaphan). Overall dimensions 27 mm by 34.2 mm by 0.3 mm thick.

*18. Coil Terminal - Plated copper alloy, 0.8 mm min thick, dimensions 20 mm by 6.2 mm. Terminals embedded in coil bobbin and soldered to coil windings.





E 3250 BV 10

AC1	
16A 250V~	16A 240Vac
10A 380V~	16A 28Vdc

U_C :

4,1 : 1

Aufstellung der Kleinschütz - Etiketten für

E 3250 BV 10 (UL)

Andere Ausführungen (Kontaktbestückungen) möglich.

SK-Nr.	Spulenspannung (U_C)	Kontaktbestückung	Bemerkung
1268	24 V dc	3s - 1ö	
1269	24 V dc	4s	
1270	120 V ac	3s - 1ö	
1271	120 V ac	4s	
1272	240 V ac	3s - 1ö	
1273	240 V ac	4s	

M. 4,1 : 1
Maße e. Toleranzang.

Änd.	Art der Änderung	Tag	Name

1989	Tag	Name
Konstr.	1.12.	Hr
Geprüft		
Normgepr.		

Halbzeug/Werkstoff

Oberfl.

Eichhoff-Werke
G. m. b. H.
Lüdenscheid

Kleinschütz-Klebeetikett

Zeichnungs-Nr.
E 3250 BV 10 SK.....

Ersatz für:

ers. durch:

T E S T R E C O R D N O. 1

SAMPLES:

The manufacturer submitted samples of the Cat. No. 3250 Relay as described in the preceding pages of this report. The following tests were considered necessary.

HEATING TEST:

METHOD

A sample of the device with an operating coil as noted was subjected to the following test. The contacts of the device were connected in series to a low voltage source of supply using 4-ft per terminal of wire size as noted. A current as indicated below was passed through all of the contacts. The device was caused to carry this current continuously until constant temperatures are obtained. Temperatures were measured by thermocouples. The tips of the thermocouples were secured to the heated parts by solder, tape, or sodium silicate.

Catalog Number: E3250 Relay
Rated Coil Voltage: 24 V dc — Test Coil Voltage: 24 V dc
Contact Current, Amps: 16 A thru terminals 43-44, 23-24, 33-4 and 3A thru Terminal 13-14. — Wire size, AWG: #14
Enclosure material: Cardboard — Size: 3 by 3 by 2

RESULTS

Thermocouple Location	Max Temperature - °C
Terminal 43 and Base	40
Coil Body	72
Bobbin near Windings	60
Base near Coil	62
Ambient	24
Coil by Change of Resistance	84

Temperature rises on coil windings to be determined by change of resistance method (in accordance with Par. 14.4 $t = \frac{R}{r}(k + t_1) - k + t_2)$

Cat. No.	Coil r(ohms) - Cold	Ambient
E3250	155.4	23°C

$$t = \frac{191.9}{155.4}(234.5 + 23) - (234.5 + 23)$$

$t = 60.5°C$

Time (Sec.)	Coil R
5	191.3
10	190.8
15	190.4
20	189.6
25	189.3
30	188.9
35	188.5
40	188.3
45	187.9
50	187.7
55	187.4
60	187.4

OVERVOLTAGE AND UNDERVOLTAGE TESTS:

METHOD

A sample of each device whose model numbers are tabulated below was energized at the indicated overvoltage until temperatures on all parts had stabilized. The voltage was then lowered to rated voltage for one hour, after which it was further lowered to the indicated undervoltage and the device was operated several times.

Model No.	Rated Voltage	Undervoltage	Overvoltage
E3250	24 V dc	19.2 V dc	26.4 V dc

OVERLOAD AND ENDURANCE TESTS:

A complete sample of the E3250 Relay was subjected to Overload and Endurance Tests in accordance with Sections 52 and 53 of the INDUSTRIAL CONTROL EQUIPMENT STANDARD (UL 508). The circuit parameters and results are tabulated below.

Terminals 23-24, 43-44, 33-34

OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Overload	Endurance
	CAT. NO.	G3250	G3250	G3250	G3250
	POLES USED	3NO	3NO	3NO	3NO
	BOX CONN. TO WHICH POLE	-	-	-	-
FOR RATING OF	AMPERES	16	16	10	10
	VOLTS	120	120	240	240
	HORSEPOWER	-	-	-	-
	PHASE/DC	1	1	1	1
TEST DATA	VOLTS - OPEN CCT.	128	124	244	246
	VOLTS - CLOSED CCT.	122	120	242	242
	PHASES/DC	1	1	1	1
	AMPERES	24	16	15	10
	POWER FACTOR	0.78	0.78	0.76	0.76
	SHUNT OHMS PER PHASE	250	375	905	1375
	OPERATIONS PER MINUTE	6	6	6	6
	TOTAL OPERATIONS	50	6000	50	6000
	RESULTS	ACE	ACE	ACE	ACE

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts Opposite Polarity	1480	NB
Uninsulated Live Parts of Different Circuits	1480	NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

OVERLOAD AND ENDURANCE TESTS:

Terminals 13 - 14

OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance
	CAT. NO.	E3250	E3250
	POLES USED	1NO	1NO
	BOX CONN. TO WHICH POLE	-	-
FOR RATING OF	AMPERES	3	3
	VOLTS	50	50
	HORSEPOWER	-	-
	PHASE/DC	DC	DC
TEST DATA	VOLTS - OPEN CCT.	50	50
	VOLTS - CLOSED CCT.	50	50
	PHASES/DC	DC	DC
	AMPERES	4.5	3
	POWER FACTOR	Resistive	
	SHUNT OHMS PER PHASE	-	-
	OPERATIONS PER MINUTE	6	6
	TOTAL OPERATIONS	50	6000
	RESULTS	ACE	ACE

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts Opposite Polarity	1480	NB
Uninsulated Live Parts of Different Circuits	1480	NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

T E S T R E C O R D N O. 2

SAMPLES:

The manufacturer submitted sampled of the E3250BV10 devices for additional ratings as described in the preceding pages of this report. The following tests were considered necessary.

TEMPERATURE TEST:

METHOD

A samples of the device with an operating coil as noted, was subjected to this test. The contacts of the device were connected in series to a rated source of supply using 4 ft per terminal of wire size as noted. A current as indicated below was passed through all of the contacts. The device was caused to carry this current continuously until constant temperatures were reached on and about the parts of the device. All temperatures were measured by thermocouples. The tips of the thermocouples were secured to the heated parts by solder, tape or sodium silicate.

Catalog Number: E3250
Contact Current, A: 20 A
Wire Size, AWG No.: 12 AWG
Enclosure Size: 2-1/2 x 2 x 3 in

Coil Voltage - 240 V ac

RESULTS

Locatation of Thermocouples	Total Temperature °C
Top of Frame	88
Coil Body	93
Bobbin and Coil Body	96
Side of Base	75
Quick Connect Terminal and Base	79
Temperature Rise of Coil by change of Resistance	83
Ambient	25

Temperature rises on coil windings to be determined by change of resistance method Temperature Rise = $\frac{R}{r}(k + t_1) - (k + t_2)$

Cat. No.	Coil r (ohms) - Cold	Ambient
E3250	2.84 K ohm	25°C
	Coil R (ohms) - Hot	Ambient
	3.75 K ohm	25°C

Temperature Rise = $\frac{3.75}{2.84}(234.5 + 25) - (234.5 + 25)$

Temperature Rise = 83°C

OVERVOLTAGE AND UNDERVOLTAGE TESTS:

METHOD

A samples of each device whose model numbers are tabulated below was energized at the indicated overvoltage until temperatures on all parts had stabilized. The voltage was then lowered to rated voltage for one hour, after which it was further lowered to the indicated undervoltage and the device was operated several times.

Model No.	Rated Voltage	Undervoltage	Overvoltage
E3250	24 V dc	19.2 V dc	26.4 V dc
	120 V ac	102 V ac	132 V ac
	240 V ac	204 V ac	264 V ac

RESULTS

The devices continued to operate without any hazardous conditions. Thus, the results were considered acceptable.

OVERLOAD AND ENDURANCE TESTS:

A complete sample of the E3250 was subjected to Overload and Endurance Tests in accordance with Sections 52 and 53 of the INDUSTRIAL CONTROL EQUIPMENT STANDARD (UL 508). The circuit parameters and results are tabulated below.

PER POLE OPPOSITE POLARITY BETWEEN POLES
OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Endurance
	CAT. NO.	E3250	E3250	E3250
	POLES USED	3NO	3NO	3NO
	BOX CONN. TO WHICH POLE	Unswitched	Unswitched	Unswitched
FOR RATING OF	AMPERES	15.2	15.2	16
	VOLTS	240 V ac	240 V ac	250 V ac
	HORSEPOWER	5	5	-
	PHASE/DC	3	3	3
TEST DATA	VOLTS - OPEN CCT.	250 V ac	250 V ac	252 V ac
	VOLTS - CLOSED CCT.	240 V ac	244 V ac	250 V ac
	PHASES/DC	3	3	3
	AMPERES	91.2	30.4	16
	POWER FACTOR	0.48	0.45	Resistive
	SHUNT OHMS PER PHASE	250	845	-
	OPERATIONS PER MINUTE	6	60	6
	TOTAL OPERATIONS	50	1000	5000
	RESULTS	ACC	ACC	ACC

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts Opposite Polarity	1480	NB
Uninsulated Live Parts of Different Circuits	1480	NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

VOLTAGE APPLIED TO ADJACENT POLES
OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Endurance
	CAT. NO.	E3250	E3250	E3250
	POLES USED	INC	INC	INC
	BOX CONN. TO WHICH POLE	-	-	-
FOR RATING OF	AMPERES	15.2	15.2	16
	VOLTS	240 V ac	240 V ac	250 V ac
	HORSEPOWER	-	-	-
	PHASE/DC	1	1	1
TEST DATA	VOLTS - OPEN CCT.	256 V ac	256 V ac	256 V ac
	VOLTS - CLOSED CCT.	250 V ac	252 V ac	252 V ac
	PHASES/DC	1	1	1
	AMPERES	91.2	30.4	16
	POWER FACTOR	0.48	0.5	Resistive
	SHUNT OHMS PER PHASE	435	1245	-
	OPERATIONS PER MINUTE	6	60	6
	TOTAL OPERATIONS	50	1000	5000
	RESULTS	ACC	ACC	ACC

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts to Enclosure	1480	NB
Switch Closed - Live Parts Opposite Polarity	1480	NB
Uninsulated Live Parts of Different Circuits	1480	NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

PER POLE OPPOSITE POLARITY BETWEEN POLES
OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Endurance
	CAT. NO.	E3250	E3250	E3250
	POLES USED	3NO	3NO	3NO
	BOX CONN. TO WHICH POLE	Unswitched	Unswitched	Unswitched
FOR RATING OF	AMPERES	16	16	20
	VOLTS	120 V ac	120 V ac	120 V ac
	HORSEPOWER	1	1	-
	PHASE/DC	1	1	1
TEST DATA	VOLTS - OPEN CCT.	125 V	125 V	125 V
	VOLTS - CLOSED CCT.	120 V	121 V	123 V
	PHASES/DC	1	1	1
	AMPERES	96	32	20
	POWER FACTOR	0.46	0.46	Resistive
	SHUNT OHMS PER PHASE	220	650	-
	OPERATIONS PER MINUTE	6	60	6
	TOTAL OPERATIONS	50	1000	5000
	RESULTS	ACC	ACC	ACC

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts Opposite Polarity	1480	NB/NB
Uninsulated Live Parts of Different Circuits	1480	NB/NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

VOLTAGE APPLIED TO ADJACENT POLES
OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Endurance
	CAT. NO.	E3250	E3250	E3250
	POLES USED	INC	INC	INC
	BOX CONN. TO WHICH POLE	-	-	-
FOR RATING OF	AMPERES	16	16	20
	VOLTS	120 V ac	120 V ac	120 V ac
	HORSEPOWER	1	1	-
	PHASE/DC	1	1	1
TEST DATA	VOLTS - OPEN CCT.	128 V	125 V	125 V
	VOLTS - CLOSED CCT.	120 V	121 V	123 V
	PHASES/DC	1	1	1
	AMPERES	96	32	20
	POWER FACTOR	0.46	0.41	Resistive
	SHUNT OHMS PER PHASE	215	765	-
	OPERATIONS PER MINUTE	6	60	6
	TOTAL OPERATIONS	50	1000	5000
	RESULTS	ACC	ACC	ACC

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts Opposite Polarity	1480	NB/NB
Uninsulated Live Parts of Different Circuits	1480	NB/NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

OVERLOAD, STALLED ROTOR, ENDURANCE, DIELECTRIC WITHSTAND

TEST	O'LOAD-ST. ROTOR-END.	Overload	Endurance	Overload	Endurance
	CAT. NO.	E3250	E3250	E3250	E3250
	POLES USED	3NO	3NO	INC	INC
	BOX CONN. TO WHICH POLE	Unswitched	Unswitched	-	-
FOR RATING OF	AMPERES	16	16	16	16
	VOLTS	28 V dc	28 V dc	28 V dc	28 V dc
	HORSEPOWER	-	-	-	-
	PHASE/DC	DC	DC	DC	DC
TEST DATA	VOLTS - OPEN CCT.	28 V	28 V	28 V	28 V
	VOLTS - CLOSED CCT.	28 V	28 V	28 V	28 V
	PHASES/DC	DC	DC	DC	DC
	AMPERES	24	16	24	16
	POWER FACTOR	Resistive	Resistive	Resistive	Resistive
	SHUNT OHMS PER PHASE	-	-	-	-
	OPERATIONS PER MINUTE	6	6	6	6
	TOTAL OPERATIONS	50	6000	50	6000
	RESULTS	ACC	ACC	ACC	ACC

DIELECTRIC WITHSTAND	Volts ac	Results
Switch Open - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts to Enclosure	1480	NB/NB
Switch Closed - Live Parts Opposite Polarity	1480	NB/NB
Uninsulated Live Parts of Different Circuits	1480	NB/NB

REMARKS: ACC - Acceptable
NB - No Breakdown

(E-482-82)

TEST RECORD NO. 3

No tests have been considered necessary due to administrative changes without a change in the electrical ratings.

Test Record Summary:

The results of this investigation indicate that the products evaluated comply with the applicable requirements and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Report by: Reviewed by:

Karsten Henrici Dirk Mueller

Karsten Henrici
Project Engineer
UL International Germany GmbH

Dirk Mueller
Engineering Manager
UL International Germany GmbH

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

TEST RECORD NO. 4

SAMPLES:

Expansion of relays, type TP3250 for Canadian market, does not require testing due to the fact those models fulfilled all requirements during the previous evaluation under UL 508 - see E76343, report date 1988-11-07. Those relays are identical to previously evaluated and there is no construction changing.

Test Record Summary:

The results of this investigation indicate that the products evaluated comply with the applicable requirements and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by

George Sayed

George Sayed
Project Engineer
UL International Germany GmbH

Reviewed by:

Stefan Ost

Stefan Ost
Reviewing Engineer
UL International Germany GmbH

Marcin Lohmann

Marcin Lohmann
Engineer
UL International Polska

Any information and documentation provided to you involving UL Mark servicesare providedon behalf of Underwriters Laboratories Inc.

TEST RECORD NO. 5

SAMPLES:

A sample of the switch TP3250 as indicated below and constructed as described herein, was submitted by the manufacturer for examination.

GENERAL:

Testing of the switch type TP3250 was not considered necessary based on the results of previous investigations. A same and higher, as described rated bobbin material has been added top report. Alternate R/C insulation tape (OANZ2) has been added to report within their established ratings. Insulation tape has a 5KV rating and is built of PETP.

The results of the above examination have been reviewed and found to comply with the requirements in the Standard for Industrial Control Equipment, UL 508 17th edition, Rev. 2005-07-11 and CSA C22.2 No. 14-05, Rev. 2005-04.

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 508 17th Edition, contains revisions through and including 2005-07-11 and CSA 22.2 No. 14-05, contains revisions through and including 2005-04 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

F. Thon

Frank Thon

Project Engineer

UL International Germany GmbH

TEST RECORD NO. 6_

SAMPLES:

No representative production samples of the Industrial Control Switches, Relay Type TP3250BV10 constructed as described herein, was submitted by the manufacturer for examination and test.

Employs the alternate Housing, Contact Slide and Case material by BASF SE, Type A3X2G7 (rated V-0, 115°C), (E41871).

Employs the alternate Housing, Contact Slide and Case material by A SCHULMAN GMBH, Type 66 GF 25 (rated V-0, 130°C) (E86615).

Employs the alternate Contadct Slide Material by BASF SE, Type A3X2G7 (rated V-0, 115°C), (E41871).

Employs the alternate Contact Slide Material by A SCHULMAN GMBH, Type 66 GF 25 (rated V-0, 130°C) (E86615).

Employs the alternate Contact Slide material, by Raschig GMBH, Type UPA 63, (rated V-0, 105°C) (E75850).

Employs the alternate Capacitor by A SCHULMAN GMBH (E86615), (rated V-0, 130°C), Type 66 GF 25 FR 5 A(f2).

Employs the alternate Coil Banding, polyester film insulating tape, rated minimum 125°C.

Employs the alternate Coil Winding, magnet wire, ANSI Grade MW75 or MW79, rated minimum 125°C.

GENERAL:

Test results relate only to the items tested.

Testing of the Industrial Control Switches, Relay Types TP3250BV10_____ was not considered necessary based on the results of previous investigations.

Tests were considered covered as follows:

Model	Test	File	Report Date	Test Record No.
TP3250BV10	ALL	E76343	1998-11-07	1, 2

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in the Standard for Industrial Control Equipment, UL508 17th edition, revised April 15, 2010 and Industrial Control Equipment, CSA C22.2 No. 14-10, revised February 2010 and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:

Katherine Matthew
Project Handler II

Reviewed by:

Ronald Breschini
Senior Staff Engineer

TEST RECORD NO. 7

SAMPLES:

No representative production samples of the Industrial Control Switches, Relay Types TP3250BV08, TP3250BV10, TP3250BV16 and TP3250URBV39, constructed as described herein, were submitted by the manufacturer for examination. Revisions were made based on technical information provided by the manufacturer.

GENERAL:

Test results relate only to the items tested.

Contact slide employed in Types mentioned above is being molded from alternate R/C (QMFZ2) material, Type “RALUPOL” UP 4385, Raschig GMBH (E75850). The material has the same or better parameters as already used materials, therefore no additional electrical or mechanical tests were considered necessary.

Tests were considered covered as follows:

Test	File	Report Date	Test Record No.
All	E76343	1998-11-07	1, 2

TEST RECORD SUMMARY

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in Standard for Industrial Control Equipment, UL 508, 17th Edition, revision 2013-10-16 and C22.2 No. 14-13, 12th Edition, issued 2013-03-01, therefore, such products are judged eligible to bear UL’s Mark as described on the Conclusion Page of this Report.

Test Record by:

Adrian Równicki
Project Engineer
UL International Polska Sp. z o.o.

Supervised by:

Pawel Stankiewicz
Engineering Leader
UL International Polska Sp. z o.o.

TEST RECORD NO. 8

SAMPLES:

Representative production samples of the _Industrial Control Switch Type TP3250, were submitted by the manufacturer for examination.

GENERAL:

Test results relate only to the items tested.

Factory location and identification was deleted in Section General. Reason: in the past two factory locations manufactured the device. By now only one factory manufacture the device and no identification is necessary.

Employs alternative polymeric material Radiflam A RV250 AF for housing, contact slide, case and cap.

Employs alternative polymeric material Valox DR48V for bobbin.

The materials have same or better parameters as already used materials, therefore no additional electrical or mechanical tests were considered necessary.

Dimensions and thicknesses of housing, contact slide (see Test Reference No. 1) and case were newly evaluated and corrected due to findings during follow-up inspection (Variation Notice E76343 21607211644).

Spacings were newly evaluated according to UL840 and CSA C22.2 No. 14-13.

These modifications do not result in electrical or mechanical behavior, therfore no additional tests were considered necessary.

Tests were considered covered as follows:

Model	Test	File	Report Date	Test Record No.
All	All	E76343	1998-11-07	1-7

The test methods and results of the above tests have been reviewed and found to comply with the requirements in the Standard for Industrial Control Equipment, UL 508 and CAN/CSA C22.2 No. 14-13.

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in the Standard for Industrial Control Equipment, UL 508 17th edition, revised 2013-10-16 and Industrial Control Equipment, CSA C22.2 No. 14-13 12th edition, revised March 2013 and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:
Dirk Wohlfahrt
Project Engineer
UL Internatinal Germany GmbH

Reviewed by:
Guido Bitter
Senior Staff Engineer
UL International Germany GmbH

C O N C L U S I O N

A sample of the product covered by this Report has been found to comply with the requirements covering the class and the product is 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 Marking are considered as Recognized Components by Underwriters Laboratories Inc.

Report by:

C. CASALINO
Engineering Assistant
Electrical Department

Reviewed by:

A. MASTROMARINO
Engineering Group Leader
Electrical Department

R. WONG
Project Engineer
Electrical Department