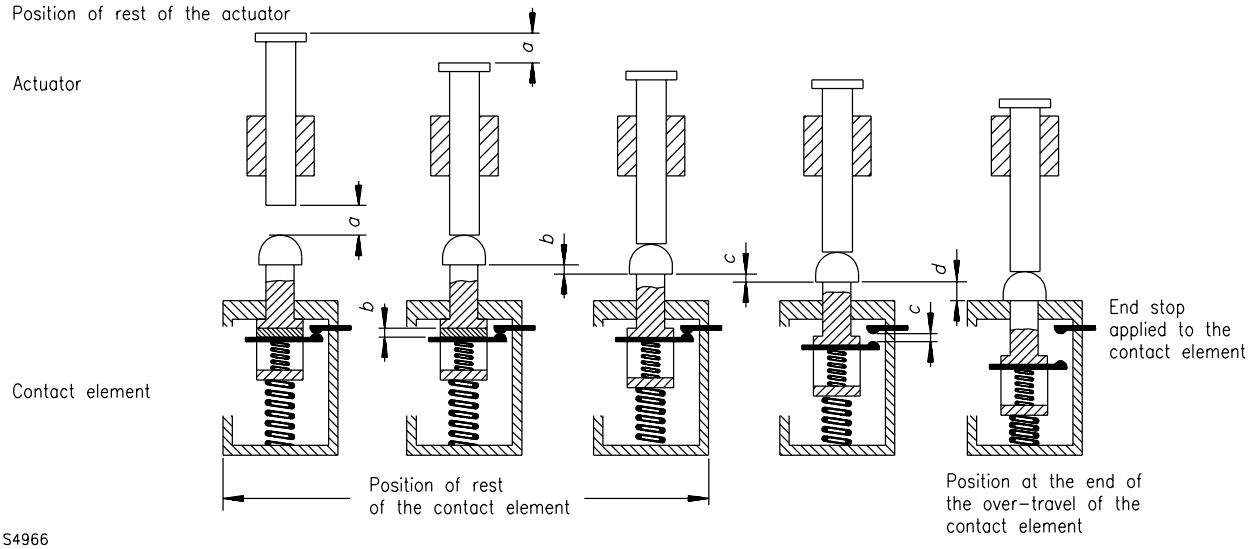
Figure 2 – Operation of PUSH-BUTTONS



a PRE-TRAVEL OF THE ACTUATOR

b PRE-TRAVEL OF THE CONTACT ELEMENT

c Minimum value required to give adequate contact gap

d OVER-TRAVEL OF THE CONTACT ELEMENT

b + c + d Total travel of the CONTACT ELEMENT

*a + b + c + d + e)** Total travel of the actuator

*NOTE Because of a possible resilient connection between the actuator and the CONTACT ELEMENT (for example, see Figure 3), the OVER-TRAVEL OF THE ACTUATOR may exceed the OVER-TRAVEL OF THE CONTACT ELEMENT by a length *e*.

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Figure 3 – Difference e between the OVER-TRAVEL OF THE ACTUATOR and that of the CONTACT ELEMENT

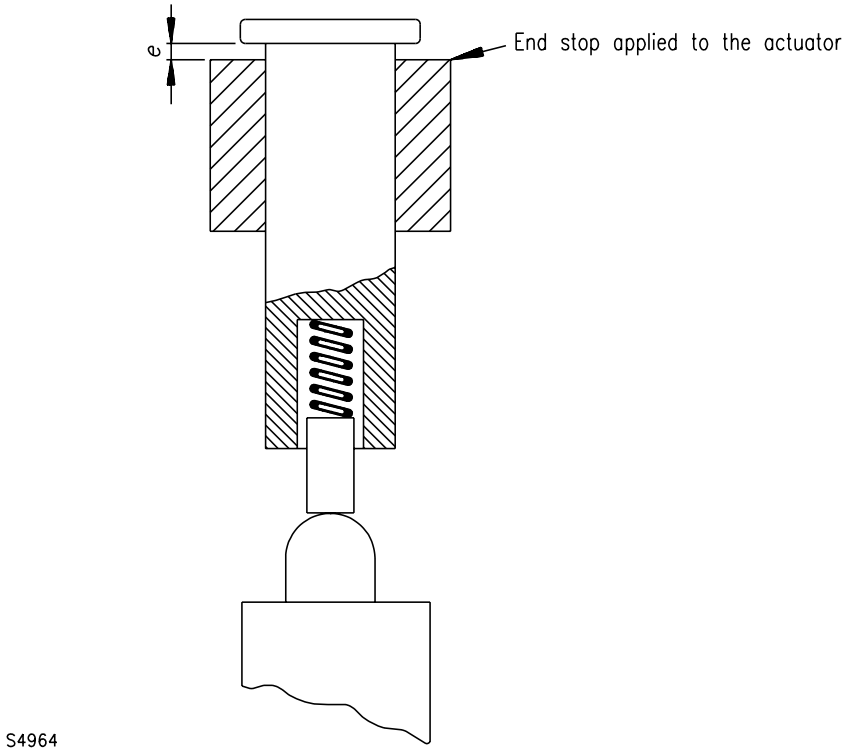

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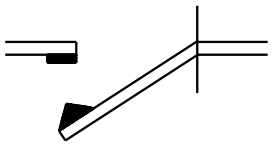
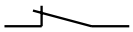
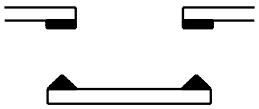
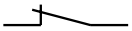
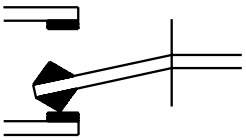
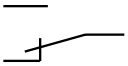
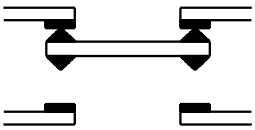
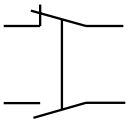
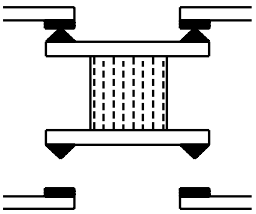
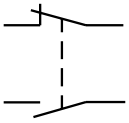
Figure 4 – Examples of CONTACT ELEMENTS (schematic sketches)

Figure No.	Figure	Symbols	Forms	Description
4a)		 Note 1	A	Single gap contact element with two terminals
		 Note 1	B	
4b)		 Note 1	X	Double gap contact element with two terminals
		 Note 1	Y	
4c)		 Note 1	C	Change-over, single gap, contact element with three terminals
4d)			Za	Change-over, double gap, contact element with four terminals Note – The contacts are of the same polarity
4e)			Zb	Change-over, double gap, contact element with four terminals (The two moving contacts are electrically separated)

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NOTE 1 Symbols according to IEC 60617.

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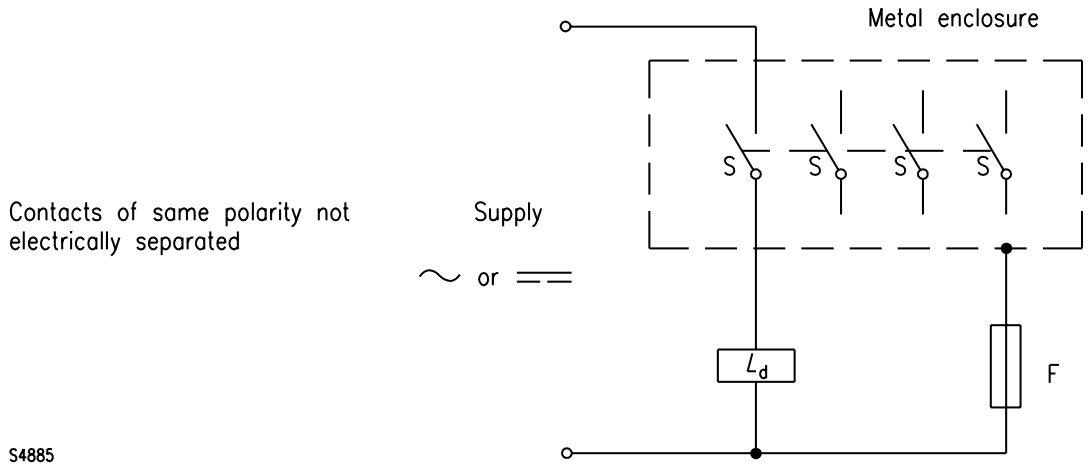
Test circuits

(see 8.3.3.5)

Multi-pole CONTROL SWITCHES

Figure 5 – Test circuits for multi-pole control switches – Contacts of same polarity, not electrically separated



L_d: Load according to Figure 7

F: Fuse or isolation measurement device

S: Contact element (NO or NC)

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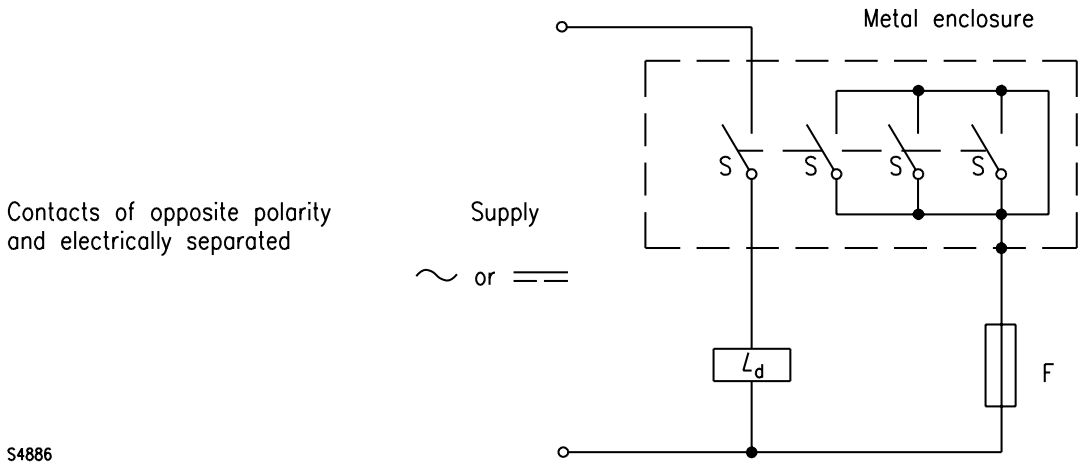
Figure 6 – Test circuits for multi-pole control switches – Contacts of opposite polarity, and electrically separated



L_d: Load according to Figure 7

F: Fuse or isolation measurement device

S: Contact element (NO or NC)

Test circuit

(see 8.3.3.5)

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Figure 7 – Load L_d details for test conditions requiring different values of make and break current and/or power factor (time constant)

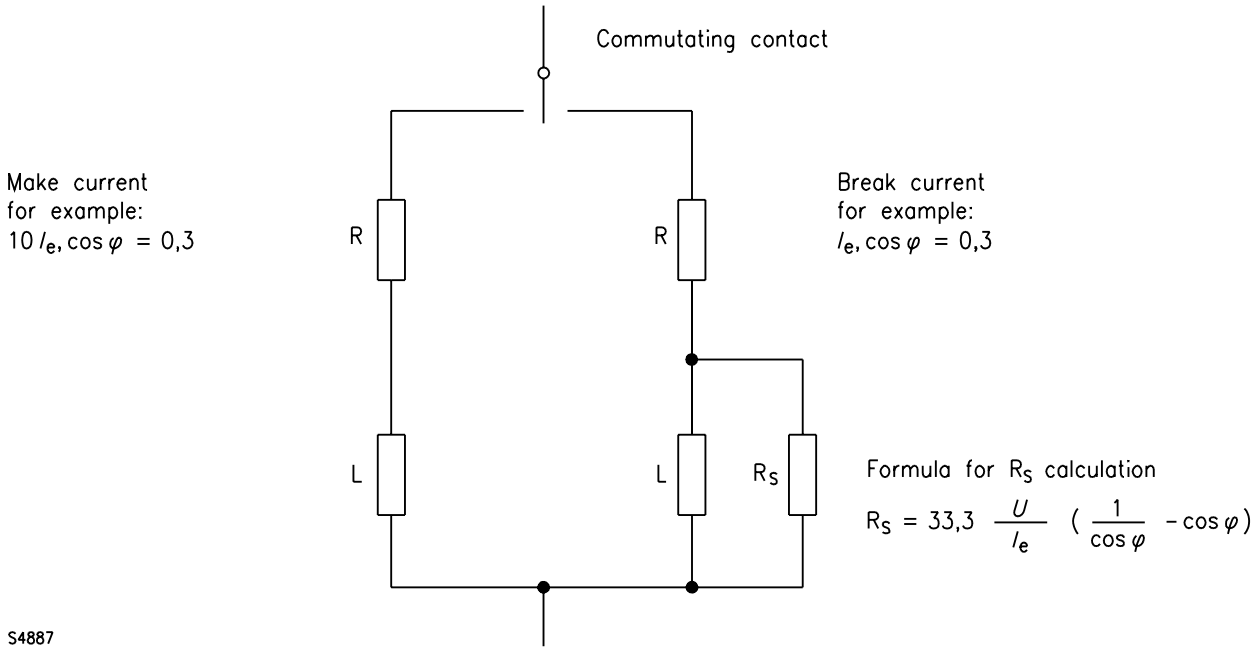
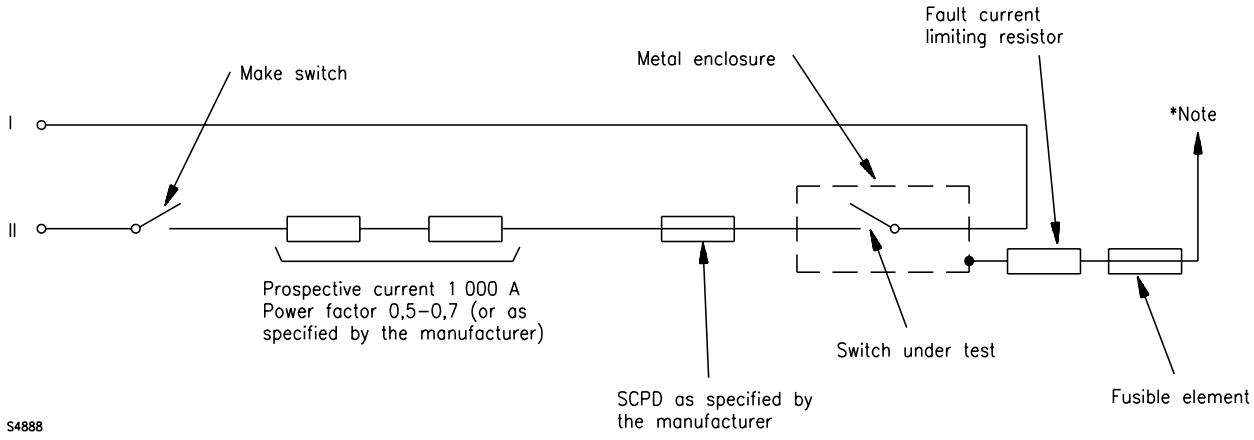


Figure 8 – Test circuit, conditional short-circuit current (see 8.3.4.2)



NOTE To be connected alternatively to I or II on successive tests.

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Figure 9 – Current/time limits for d.c. test loads (see 8.3.3.5.3)

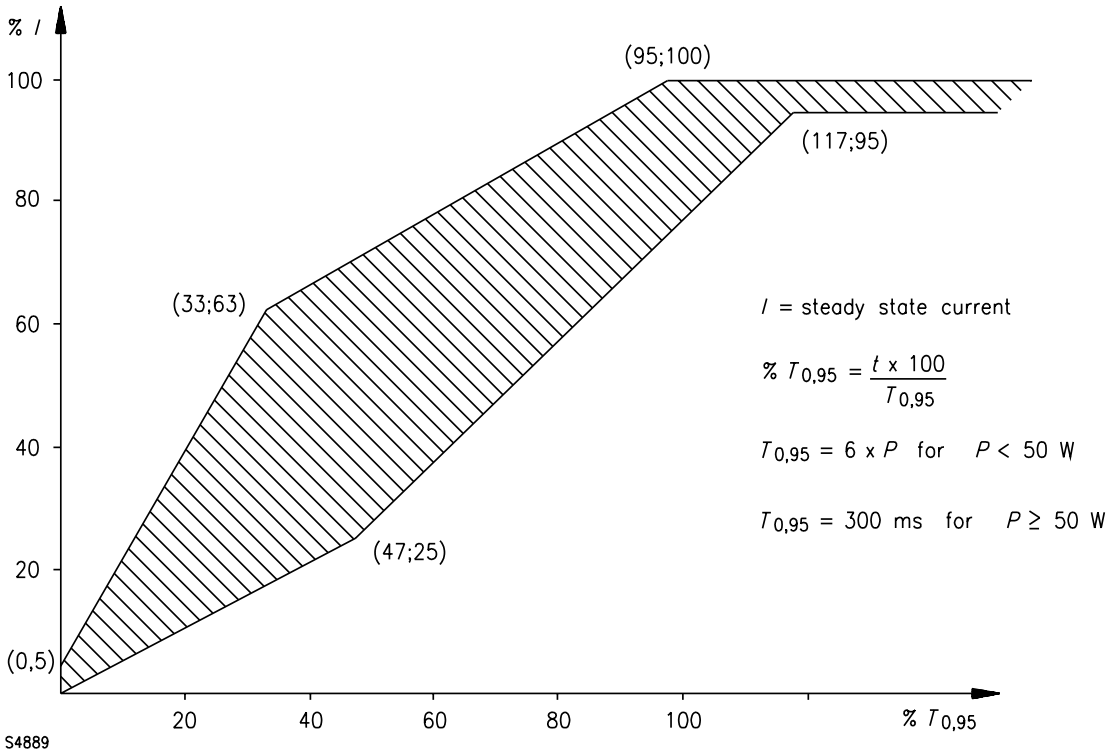

Figure 9DV D2 *Modification of Figure 9 by adding the following note:*

Note: The direct current inductive loads found in control circuits are usually electromagnetically driven relays, contactors, and solenoids with solid iron loads rated 50 W or less. The influence of these loads on the contacts of the CONTROL CIRCUIT DEVICE is determined by the stored energy of the inductor, which, in turn, is related to the average rate of rise of the current in the inductor or to the charging time of the inductor. It has been empirically determined that inductive loads up to 50 W almost always have a charging time (T0,95) to 95% of their full current value of 6 ms per watt or less.

Figure 101DV D2 *Addition:*

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Figure 101DV – Polarity

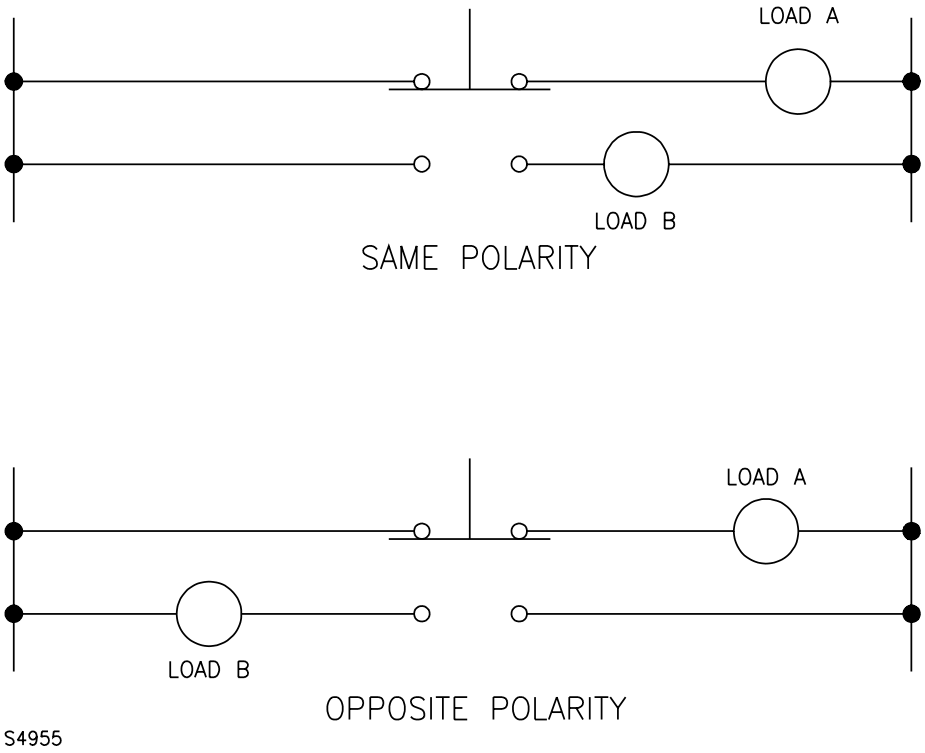

Figure 102DV D2 *Addition:*

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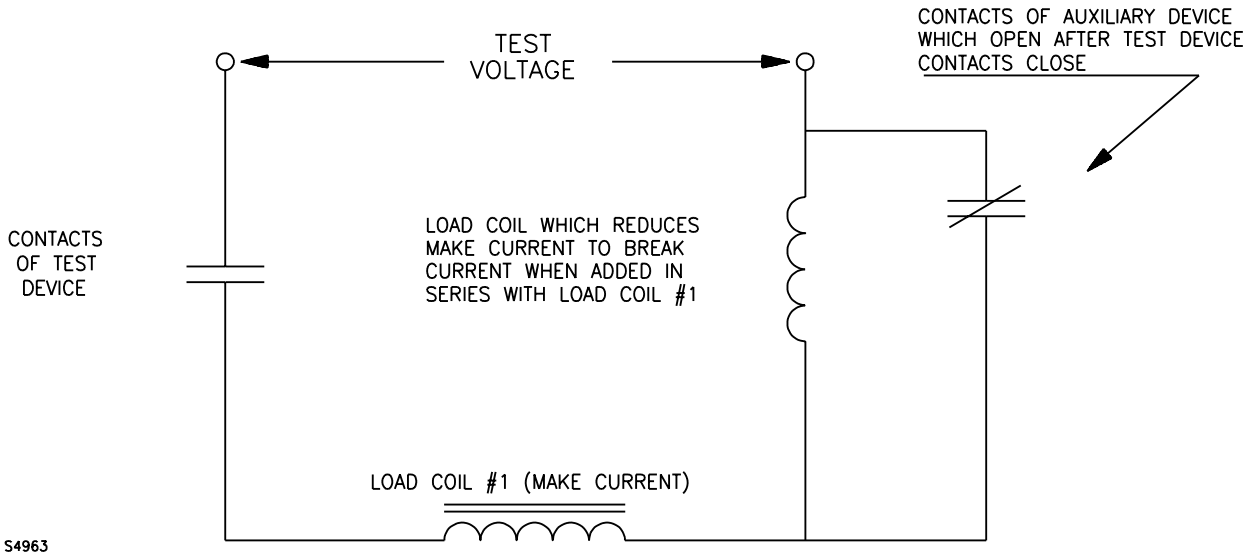
Figure 102DV – AC contacts under test



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Annex A
(normative)

Electrical ratings based on utilization categories

(see 3.1)

Table A.1 – Examples of contact rating designation based on utilization categories

Designation [1)]	Utilization category	Conventional enclosed thermal current I_{the} A	Rated operational current I_e (A) at rated operational voltage U_e						VA rating VA	
Alternative current			120 V	240 V	380 V	480 V	500 V	600 V	M	B
A150	AC-15	10	6	–	–	–	–	–	7 200	720
A300	AC-15	10	6	3	–	–	–	–	7 200	720
A600	AC-15	10	6	3	1,9	1,5	1,4	1,2	7 200	720
B150	AC-15	5	3	–	–	–	–	–	3 600	360
B300	AC-15	5	3	1,5					3 600	360
B600	AC-15	5	3	1,5	0,95	0,75	0,72	0,6	3 600	360
C150	AC-15	2,5	1,5	–	–	–	–	–	1 800	180
C300	AC-15	2,5	1,5	0,75	–	–	–	–	1 800	180
C600	AC-15	2,5	1,5	0,75	0,47	0,375	0,35	0,3	1 800	180
D150	AC-14	1,0	0,6	–	–	–	–	–	432	72
D300	AC-14	1,0	0,6	0,3	–	–	–	–	432	72
E150	AC-14	0,5	0,3	–	–	–	–	–	216	36
Direct current			125 V	250 V		400 V	500 V	600 V		
N150	DC-13	10	2,2	–		–	–	–	275	275
N300	DC-13	10	2,2	1,1		–	–	–	275	275
N600	DC-13	10	2,2	1,1		0,63	0,55	0,4	275	275
P150	DC-13	5	1,1	–		–	–	–	138	138
P300	DC-13	5	1,1	0,55		–	–	–	138	138
P600	DC-13	5	1,1	0,55		0,31	0,27	0,2	138	138
Q150	DC-13	2,5	0,55	–		–	–	–	69	69
Q300	DC-13	2,5	0,55	0,27		–	–	–	69	69
Q600	DC-13	2,5	0,55	0,27		0,15	0,13	0,1	69	69
R150	DC-13	1,0	0,22	–		–	–	–	28	28
R300	DC-13	1,0	0,22	0,1		–	–	–	28	28
									M = make	
									B = break	

NOTE 1 The letter stands for the conventional enclosed thermal current and identifies (a.c. or d.c.): for example B means 5 A a.c. The rated insulation voltage U_i is at least equal to the number after the letter.

NOTE 2 The rated operational current I_e (A), the rated operational voltage U_e (V) and the break apparent power B (V.A) are correlated by the formula $B = U_e \cdot I_e$.

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