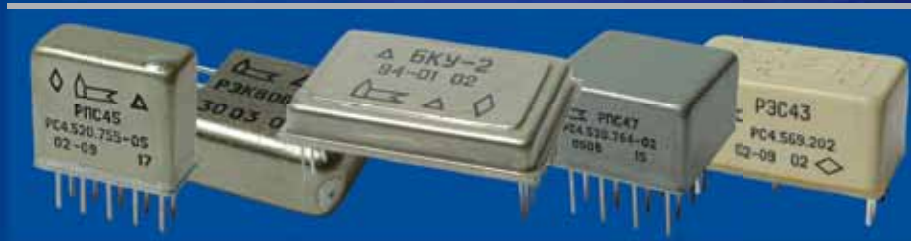


CONCERN "SOZVEZDIE"
DEPARTMENT OF RADIO-ELECTRONIC INDUSTRY
MINISTRY OF INDUSTRY AND TRADE



RELAYS AND SWITCHES

PRODUCT CATALOG 2011



JOINT-STOCK COMPANY

RESEARCH & DEVELOPMENT
ENTERPRISE

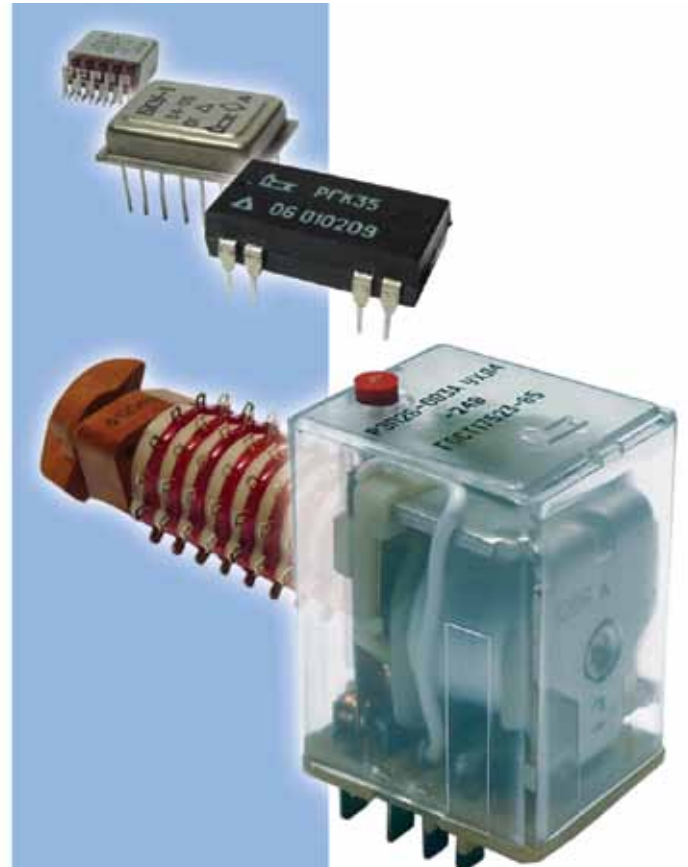
VELIKIY NOVGOROD

The history of our enterprise began in 1967. For decades following its establishing it underwent several restructurings, but relay manufacturing has always remained its major activity. More than 300 models of 40 relay types have been designed by the experienced engineering staff and are now under production.



OUR PRODUCTS

- Electromagnetic Relays
 - Reed
 - Polarized
 - Non- Polarized
 - High Frequency
 - Low Frequency
 - Slave
- Time Relays
- Non-Contact Switching Devices
- Mechanical Switches
- Light-Signal Armature
- Phase Power Regulators





OUR ENTERPRISE HAS A FULL TECHNOLOGICAL PRODUCTION CYCLE.

**Priority customer orientation is our main principle.
All steps of the production cycle are under our control!**

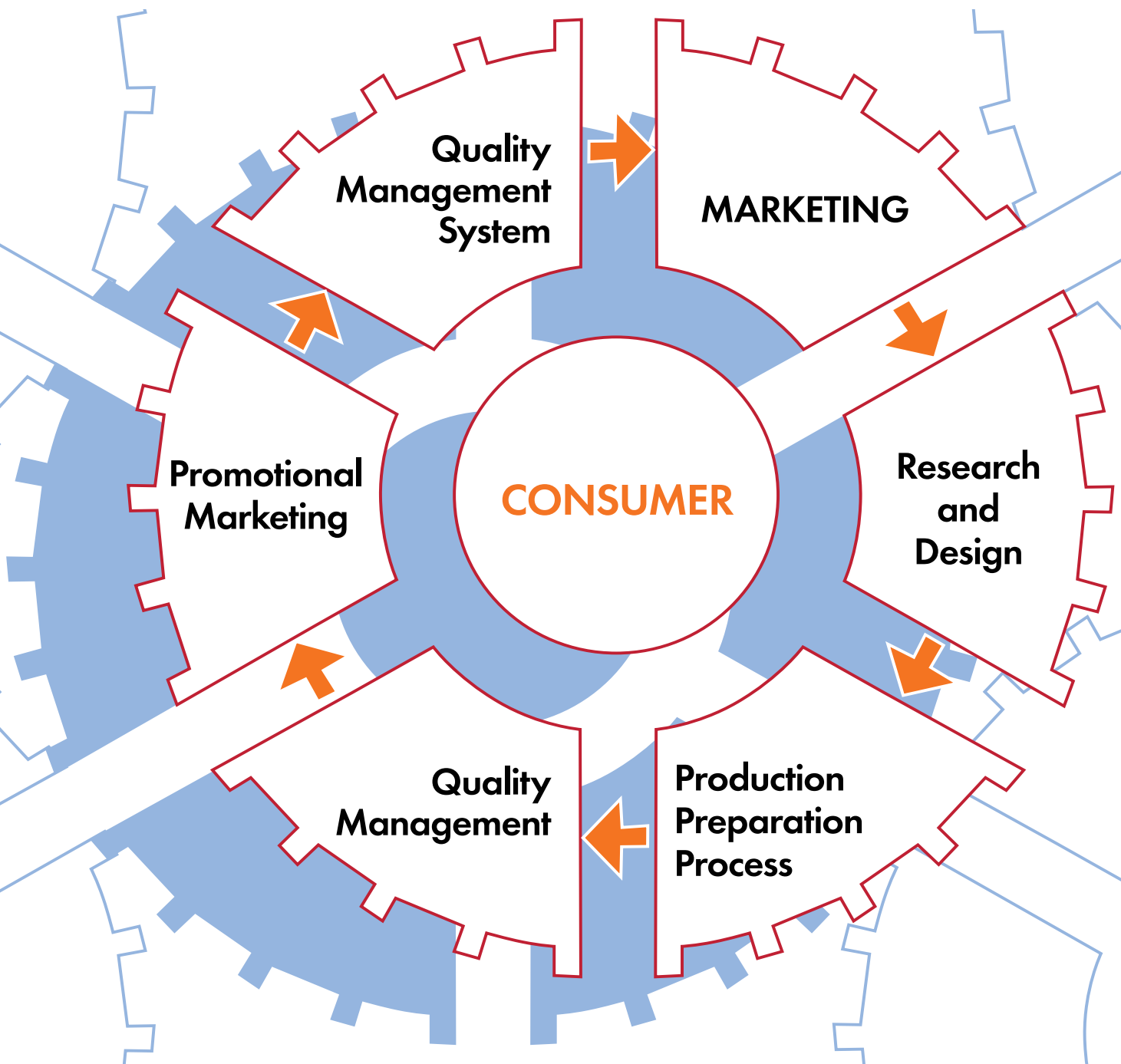


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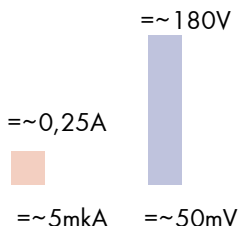
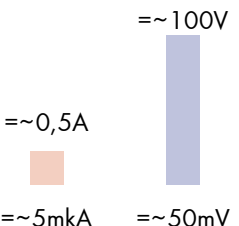
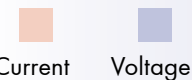
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Electromagnetic Reed Relays

Relay Type	RGK 15	RGK 29	RGK 35
Configuration			
General	These are Non-Polarized Monostable Relays in Plastic Molded Packages		
Package Type	DIP-Type	DIL-Type incl. for Surface Mount Technology	
Production Format	Mass Production	Mass Production	Mass Production
Weight, g, not More than	8,5	1,8/2,3	2,3/3,0
Length, Width, Height, mm (Incl. Terminals)	23,7(29) x 12,9 x 9,7(13)	19,6 x 6,8(8,2) x 5,1(8,7)	19,6 x 9,3(10,1) x 5,1(8,7)
Technical Regulations	Br0.450.003 TY	ИДЯУ.647613.002 TY	ИДЯУ.647613.012 TY

Contact Parameters				
Contact Number and Contact Type	2 Make Contacts	1 Make Contact	2 Make Contacts	
Type of Hermetically Sealed Contacts	MKA 20101	MKA 14103		
Resistance, Ohm	0,2 (at 6V 10mA)	0,15 (at 6V 10mA)		
Operate/Release Time, ms	1,5/0,5	1,0/0,5	1,0/0,5	
Maximum Switch Mode (The Number of Switching Cycles)	$\approx 10^{-3} \text{ A } 30\text{V } (9 \cdot 10^7)$ $\approx 0,1\text{A } 30\text{V } (9 \cdot 10^6)$ $\approx 0,25\text{A } 30\text{V } (9 \cdot 10^5)$ $\approx 0,03\text{A } 180\text{V } (9 \cdot 10^5)$	$\approx 10^{-2} \text{ A } 6\text{V } (10^8)$ $\approx 5 \cdot 10^{-2} \text{ A } 100\text{V } (10^7)$ $\approx 0,1\text{A } 100\text{V } (5 \cdot 10^6)$ $\approx 0,5\text{A } 20\text{V } (5 \cdot 10^6)$		
Minimum Switch Mode	$\approx 5 \cdot 10^{-6} \text{ A } 5 \cdot 10^{-2} \text{ V}$	$\approx 5 \cdot 10^{-9} \text{ A } 5 \cdot 10^{-2} \text{ V}$		
Switch Mode Tolerance (Switching Voltage and Current Range)				
 Current Voltage	$\approx 5\text{mA}$	$\approx 50\text{mV}$	$\approx 5\text{mA}$	$\approx 50\text{mV}$



Electromagnetic Reed Relays

Coil Parameters			
Operating Voltage, V	5; 6; 12; 24; 27	5; 6; 9; 12; 15; 24	6; 12; 15; 24
Resistance, Ohm	155; 650; 2400	200; 500; 750; 1000; 1400; 2500	220; 600; 1200; 3200
Dielectric Strength and Insulation Resistance			
Between Contacts and Coil	~500V; 1000MOhm	~500/3000V; 1000/10000MOhm	
Between Contacts	~200V; 1000MOhm	~180/160V; 1000/10000MOhm	
Operating Conditions			
Temperature, °C	-60 to 85	-50 to 70	
Humidity, %	98 at 35 °C		
Air Pressure, Pa	$1,3 \cdot 10^{-4} \div 3,03 \cdot 10^5$	$6,7 \cdot 10^2 \div 3,03 \cdot 10^5$	
Vibration Loads, Hz/g	1-2000/20		
Shock Resistance, g	150		
Overall and Mounting Dimensions			

Electromagnetic Reed Relays




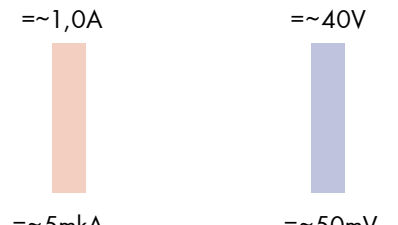
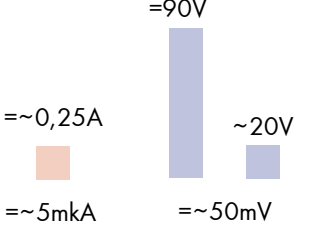
Relay Type	RGK 36	RGK 38	RGK 56
Configuration			
General	Non-Polarized Miniature Monostable Relay		
		Models available: without LED, non-shielded; shielded, without LED; with LED, non-shielded; with LED, shielded.	with LED
Package Type	Metal SIL Type	DIL-Type Molded Package; Surface Mount Models Available	Metal Package
Production Format	Mass Production	Mass Production	Mass Production
Weight, g, not More than	2,6	2,4/3	2,8
Length, Width, Height, mm (Incl. Terminals)	22,1x5,1x6,4(9,6)	19,6x6,8(8,2)x5,1(8,7)	22(27)x6x7,2(7,5)
Technical Regulations	ИДЯУ.647613.014 ТУ	ИДЯУ.647613.017 ТУ	ИДЯУ.647613.054 ТУ
Contact Parameters			
Contact Number and Contact Type	1 Make Contact		1 Change-over Contact
Type of Hermetically Sealed Contacts	MKA 14103		MKS 14104
Resistance, Ohm	0,15 (at 6V 10 mA)		0,3
Operate/Release Time, ms	1,0/0,5		0,5/2,0
Maximum Switch Mode (The Number of Switching Cycles)	$\approx 10^{-2}$ A 6V (10^6) $\approx 5 \cdot 10^{-2}$ A 100V (10^6) $\approx 0,1$ A 100V (10^6) $\approx 0,5$ A 20V (10^6)		$\approx 10^{-2}$ A 5V (10^6) $\approx 0,25$ A 36V ($5 \cdot 10^5$) $\approx 0,5$ A 60V (10^5)
Minimum Switch Mode	$\approx 5 \cdot 10^{-9}$ A 10^{-5} V		$\approx 5 \cdot 10^{-6}$ A $5 \cdot 10^{-2}$ V
Switch Mode Tolerance (Switching Voltage and Current Range)	$\approx 0,5$ A  ≈ 5 nA	≈ 100 V  ≈ 10 mV	$\approx 0,5$ A  ≈ 5 mA ≈ 60 V  ≈ 50 mV
	 Current  Voltage		



Electromagnetic Reed Relays

Coil Parameters			
Operating Voltage, V	5; 6; 12; 15; 24; 27	5; 6; 12; 27	3; 5; 6; 12; 27
Resistance, Ohm	1400; 1900; 3200; 6750	200; 500; 1000; 2500	115; 200; 500; 1000; 2500
Dielectric Strength and Insulation Resistance			
Between Contacts and Coil	~500V; 1000MOhm		~500V; 500MOhm
Between Contacts	~130V; 1000MOhm		~127V; 500MOhm
Operating Conditions			
Temperature, °C	-50 to 70	-60 to 85	-60 to 100
Humidity, %	98 at 35 °C		
Air Pressure, Pa	$6,7 \cdot 10^2 \div 3 \cdot 10^5$		
Vibration Loads, Hz/g	1-2000/20		
Shock Resistance, g	50	500	500 (9 shocks)
Terminal Position on the Relay Socket			
Circuit Diagram			

Electromagnetic Reed Relays

Relay Type	RGK 13	RGK 14	RGA 12
Configuration			
General	Non-Polarized Monostable not Hermetically Sealed Relay		Models with LED, shielded available
Package Type	Plastic Molded, not Hermetically Sealed		Plastic Molded Package
Production Format	Mass Production	Mass Production	Mass Production
Weight, g, not More than	13	18	1,5
Length, Width, Height, mm (Incl. Terminals)	30 x 13 x 15 (21)	30 x 20 x 15 (21)	15 (27,7) x 6,1 x 6,55
Technical Regulations	Br0.450.001 TY	Br0.450.001 TY	ИДЯУ.647613.036TY
Contact Parameters			
Contact Number and Contact Type	1 Change-over Contact	2 Change-over Contacts	1 Make Contact
Type of Hermetically Sealed Contacts	KEM 3		MKA 10704
Resistance, Ohm	0,6 (at 6V 10mA)		0,3 (at 6V 10mA)
Operate/Release Time, ms	2,0/2,5		0,8/0,3
Maximum Switch Mode (The Number of Switching Cycles)	$\approx 0,25A \ 40V (5 \cdot 10^5)$ $\approx 0,5A \ 36V (10^4)$ $\approx 1,0A \ 36V (10^3)$ $\approx 0,15A \ 36V (8 \cdot 10^5)$		$\approx 1,5 \cdot 10^{-4}A \ 10^{-1}V (2,5 \cdot 10^6)$ $\approx 0,25A \ 90V (10^5)$ $\sim (400-1000MHz) \ 0,25A \ 20V (10^5)$
Minimum Switch Mode	$\approx 5 \cdot 10^{-6}A \ 5 \cdot 10^{-2}V$		$\approx 10^{-6}A \ 5 \cdot 10^{-2}V$
Switch Mode Tolerance (Switching Voltage and Current Range)			
Current Voltage	$\approx 1,0A$ $\approx 5mkA$	$\approx 40V$ $\approx 50mV$	$\approx 0,25A$ $\approx 5mkA$ $\approx 90V$ $\approx 20V$ $\approx 50mV$



Electromagnetic Reed Relays

Coil Parameters

Operating Voltage, V	3; 5; 6,3; 12,6; 27		5; 12
Resistance, Ohm	28,2; 68,6; 134; 440; 1700	15,2; 36,5; 63; 210; 1160	200; 650

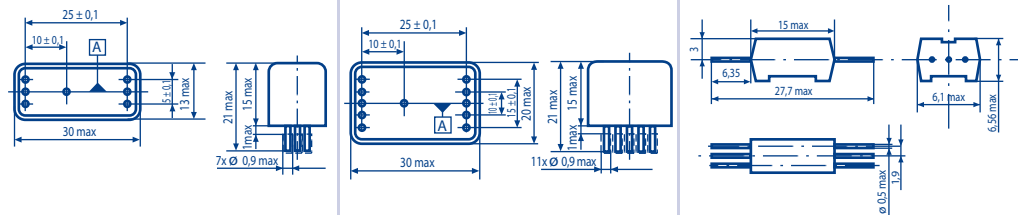
Dielectric Strength and Insulation Resistance

Between Contacts and Coil,	~500V; 500MOhm	~500V; 1000MOhm
Between Contacts	~125V; 500MOhm	~130V; 1000MOhm

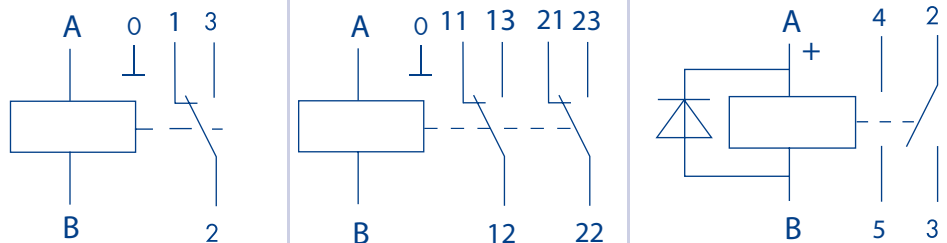
Operating Conditions

Temperature, °C	-40 to 70	-60 to 85
Humidity, %	98 at 35 °C	
Air Pressure, Pa	$5,3 \cdot 10^4 \div 2,97 \cdot 10^5$	$6,7 \cdot 10^2 \div 3 \cdot 10^5$
Vibration Loads, Hz/g	1-600/5	1-2000/20
Shock Resistance, g	15	500

Terminal Position on the Relay Socket



Circuit Diagram



Electromagnetic Reed Relays




Relay Type	RES 55	RES 43	RPS 49
Configuration			
General	Small Size 2-Position Monostable Relay	Non-Polarized Monostable Relay with One or Two Coils	Polarized 2-Position Monostable Relay with One or Two Coils
Package Type	Cylindrical E/M Shield	Plastic Molded	Metal Package
Production Format	Mass Production	Mass Production	Mass Production
Weight, g, not More than	6	15	45
Length, Width, Height, mm (Incl. Terminals)	31,5(33)x9,4(12,7)	30x17x15(21)	51x25x18,5(22,5)
Technical Regulations	PC0.456.011TY	КЦ0.450.014 TY	PC0.452.083 TY
Contact Parameters			
Contact Number and Contact Type	1 Change-over Contact	2 Make Contacts	2 Make or 2 Break, or 1 Make, 1 Break Contacts
Type of Hermetically Sealed Contacts	KEM 3	KEM 2	MKA 27101
Resistance, Ohm	0,18; 0,5	0,2 (at 6V 10 mA)	0,25 (at 6V 10mA)
Operate/Release Time, ms	1,5/2,3	1,3/0,5	4-15/1,5-2,5
Maximum Switch Mode (The Number of Switching Cycles)	$\approx 10^{-2}A$ 6V ($2 \cdot 10^6$) $\approx 6 \cdot 10^{-2}A$ 127V (10^6) $\approx 0,5A$ 36V (10^4) $\approx 0,5A$ 36V (10^3)	$\approx 10^{-3}A$ 30V (10^8) $\approx 0,1A$ 30V (10^7) $\approx 0,25A$ 30V (10^6) $\approx 0,03A$ 180V (10^6)	$\approx 0,1A$ 60V ($4 \cdot 10^6$) $\approx 0,2A$ 60V ($1,5 \cdot 10^6$) $\approx 0,35A$ 30V ($0,8 \cdot 10^6$)
Minimum Switch Mode	$\approx 5 \cdot 10^{-6}A$ $5 \cdot 10^{-2}V$	$\approx 5 \cdot 10^{-6}A$ $5 \cdot 10^{-2}V$	$\approx 10^{-6}A$ $10^{-3}V$
Switch Mode Tolerance (Switching Voltage and Current Range)			
Current	$\approx 0,5A$	$\approx 0,25A$	$\approx 0,35A$
Voltage	$\approx 127V$	$\approx 180V$	$\approx 60V$
	$\approx 5mA$ $\approx 50mV$	$\approx 5mA$ $\approx 50mV$	$\approx 1mA$ $\approx 1mV$



Electromagnetic Reed Relays

Coil Parameters			
Operating Voltage, V	3; 5; 6; 10; 12,6; 27; 48	10; 12; 27; 48	5; 10; 12; 24; 27
Resistance, Ohm	35; 67; 95; 377; 1880; 4400	2x280; 2x1200; 760; 7500	90; 68; 200; 400; 305; 214; 790; 1580; 1100
Dielectric Strength and Insulation Resistance			
Between Current Carrying Circuits	~500V; 500MOhm	~500V; 500MOhm	~500V; 500MOhm
Between Coils	-	~300V; 500MOhm	-
Between Contacts	~150/125V; 500MOhm	~200V; 500MOhm	~500V; 500MOhm
Operating Conditions			
Temperature, °C	-60 to 85	-60 to 100	-10 to 70
Humidity, %	98 at 35 °C		
Air Pressure, Pa	$6,6 \cdot 10^2 \div 3 \cdot 10^5$	$1,33 \cdot 10^{-4} \div 2,13 \cdot 10^5$	$5,3 \cdot 10^4 \div 2,03 \cdot 10^5$
Vibration Loads, Hz/g	1-3000/25	5-2000/15	5-200/4
Terminal Position on the Relay Socket			
Circuit Diagram			

Electromagnetic Polarized High-Frequency Relays



Relay Type	RPV 5	RPA 11	RPA 12
Configuration			
General	2-Position Relays: RPV 5/4 – Bistable RPV 5/7 – Monostable	2-Position Bistable Relay	2-Position Monostable Relay
Package Type	Metal not Hermetically Sealed Package	Metal Hermetically Sealed Package	
Production Format	Mass Production	Mass Production	Mass Production
Weight, g, not More than	30	20	
Length, Width, Height, mm (Incl. Terminals)	32(50) x 28(36) x 10,5	25,5(32) x 26(38) x 11	
Technical Regulations	Бр0.452.002 ТУ	Бр0.450.000ТУ	Бр0.450.000ТУ

Contact Parameters





Contact Number and Contact Type	1 Change-over Contact	
Material/Coating	PtIr10; Au999,9/Au-Co (99,9); Ag999,9	AgCu90; Au999,9/Au-Co (99,9); Ag999,9
Resistance, Ohm	1,5; 0,15	1,5; 0,1
Operate/Release Time, ms	5/3	
Maximum Switch Mode (The Number of Switching Cycles)	\approx ~(to 1 Hz) 10^{-4} A 10V (10^5) \approx ~(to 500 MHz) 0,8A 30V (10^5) \approx ~(to 1 kHz) 0,2A 110V (10^5) \approx ~(to 1 kHz) 0,1A 250V (10^5)	\approx ~(to 150 MHz) 0,8A 30V (10^5) \approx ~(to 10 kHz) 0,2A 110V (10^5) \approx ~(to 10 kHz) 0,1A 250V (10^5) \approx ~(to 10 kHz) 0,4A 30V (10^5)
Minimum Switch Mode	\approx ~ 10^{-6} A $5 \cdot 10^{-2}$ V	

Switch Mode Tolerance

(Switching Voltage and Current Range)

 Current
 Voltage

to 150 MHz

 \approx ~0,8A
 \approx ~250 V
 \approx ~1mA
 \approx ~0,05 V



Electromagnetic Polarized High-Frequency Relays

Coil Parameters

Operating Voltage, V	27	13; 27	2,4; 13; 27
Resistance, Ohm	1100	280;1100	15; 280; 1100

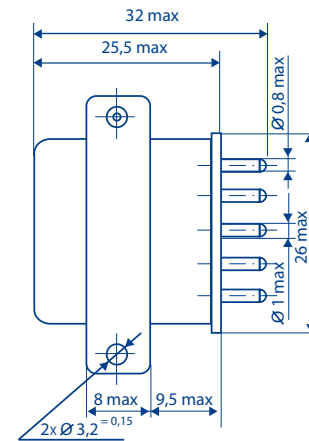
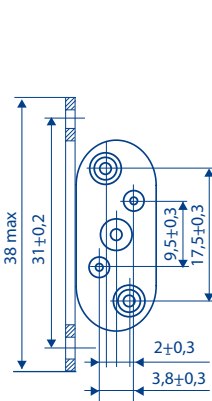
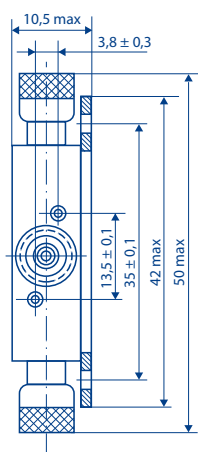
Dielectric Strength and Insulation Resistance

Between Current Carrying Circuits	~500V; 200MΩ	~500V; 500MΩ
Between Contacts	~500V; 500MΩ	~500V; 500MΩ

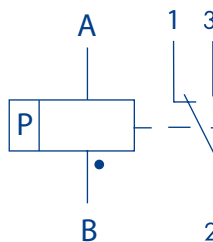
Operating Conditions

Temperature, °C	-60 to 100	
Humidity, %	98 at 35 °C	
Air Pressure, Pa	$6,6 \cdot 10^2 \div 2,13 \cdot 10^5$	$1,3 \cdot 10^{-4} \div 3 \cdot 10^5$
Vibration Loads, Hz/g	50-2000/10	600-2500/10
Shock Resistance, g	150	



Overall and Connection Dimensions

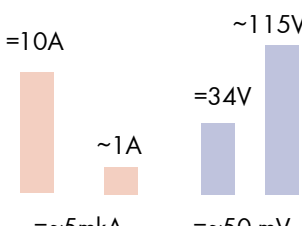
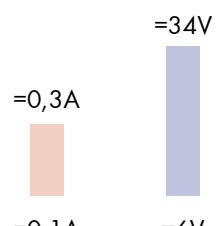


Circuit Diagram



Electromagnetic Polarized High-Frequency Relays

Relay Type	DP 12	RPS 18/4	RPS 18/5	RPS 18/7
Configuration				
General	2-Position Bistable Relay	2-Position Bistable Relay	3-Position Monostable Relay	2-Position Monostable Relay
Package Type	Metal Hermetically Sealed	Plastic not Hermetically Sealed		
Production Format	Mass Production	Mass Production		
Weight, g, not More than	220	80		
Length, Width, Height, mm (Incl. Terminals)	33(54) x 41 x 41(49,5)	40,5 x 34,5 x 24(34)		
Technical Regulations	БГО.452.001 ТУ	ЯЛО.452.088 ТУ	ЯЛО.452.089 ТУ	ЯЛО.452.090 ТУ



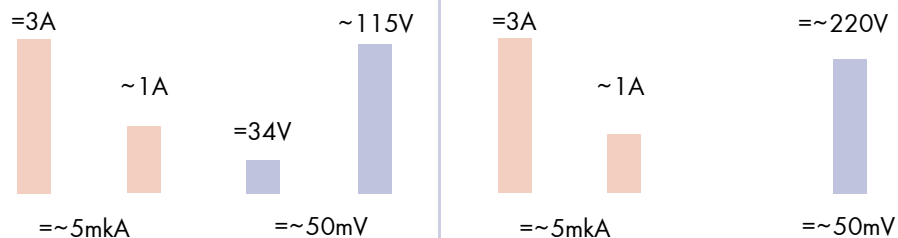
Contact Parameters				
Contact Number and Contact Type	12 Change-over Contacts		1 Change-over Contact	
Material/Coating	Ag999; Au999,9/AuCo99,9		PtIr-10/-	
Resistance, Ohm	0,1; 0,25; 1,0; 2,0		1,5	
Operate Time, ms	12	10	5; 10	12; 10
Maximum Switch Mode (The Number of Switching Cycles)	=2A 34V (10 ⁵) =~0,5A 115V (10 ⁴) =10A 32V (100 make)		=0,3A 34V (5 · 10 ⁵)	
Minimum Switch Mode	=~5 · 10 ⁻⁶ A 5 · 10 ⁻² V		=0,1A 6V	=0,2A 6V
Switch Mode Tolerance (Switching Voltage and Current Range)	 <p>Current: =10A, ~1A, =~5mkA Voltage: ~115V, =34V, =~50 mV</p>		 <p>Current: =0,3A, =0,1A Voltage: =34V, =6V</p>	



Electromagnetic Polarized High-Frequency Relays

Coil Parameters					
Operating Voltage, V	12; 27	1,6-2,4 ; 4-6	27-33; 6,4-9,6; 2,7-3,3; 1,6-2,4	1,3-2,4; 5,2-9,6; 2,9-4,2; 8-12; 1,6-2,4; 6,4-9,6; 3,2-4,8	
Resistance, Ohm	75; 420	2500; 275	6; 275; 2500; 12000	275; 1600; 2500; 4500; 12000; 24000	
Dielectric Strength and Insulation Resistance					
Between Current Carrying Circuits	~500V; 200MOhm		~500V; 200MOhm		
Between Contacts			~350V; 200MOhm		
Operating Conditions					
Temperature, °C	-60 to 80		-50 to 80	-50 to 85	
Humidity, %	98 at 35°C		98 at 25 °C		
Air Pressure, Pa	$6,6 \cdot 10^2 \div 1,06 \cdot 10^5$		$6,6 \cdot 10^2 \div 2,02 \cdot 10^5$		
Vibration Loads, Hz/g	5-1500/10		5-600/2,5	5-600/2	5-600/5
Shock Resistance, g	150				
Overall and Connection Dimensions					
Circuit Diagram					

Electromagnetic Polarized Relays

Relay Type	RPS 20	RPS 32
Configuration	 	
General	2-Position Bistable Relay	
Package Type	Metal not Hermetically Sealed	Metal Hermetically Sealed
Production Format	Mass Production	Mass Production
Weight, g, not More than	20	
Length, Width, Height, mm (Incl. Terminals)	24(30,5) x 22,5(39,5) x 10	
Technical Regulations	PC0.452.055 TV	ЯЛ0.452.080 TV
Contact Parameters		
Contact Number and Contact Type	2 Change-over Contacts	
Material/Coating	Ag999; Au999,9/AuCo99,9	PtIr-10; Ag999/AuCo99,9
Resistance, Ohm	0,25; 1,0	0,25; 1,0; 1,5
Operate Time, ms	10	5
Maximum Switch Mode (The Number of Switching Cycles)	=2A 34V (10 ⁴) =3A 27V (10 ⁴) ~1A 115V (10 ⁴)	=10 ⁻² A 220V (10 ⁶) =0,5A 34V (10 ⁶) =3,0A 34V (10 ⁵) ~1,0A 127V (10 ⁴) ~0,5A 220V (10 ⁴)
Minimum Switch Mode	=~5 · 10 ⁻⁶ A 5 · 10 ⁻² V	=~5 · 10 ⁻⁶ A 5 · 10 ⁻² V
Switch Mode Tolerance (Switching Voltage and Current Range)		
Current	=~5mA	=~5mA
Voltage	=~50mV	=~50mV



Electromagnetic Polarized Relays

Coil Parameters

Operating Voltage, V	4,6; 6; 12; 15; 20; 27	2,4; 4; 6; 10; 12; 15; 20; 27
Resistance, Ohm	18; 30; 130; 175; 310; 500; 660	5; 15; 25; 75; 110; 175; 310; 500

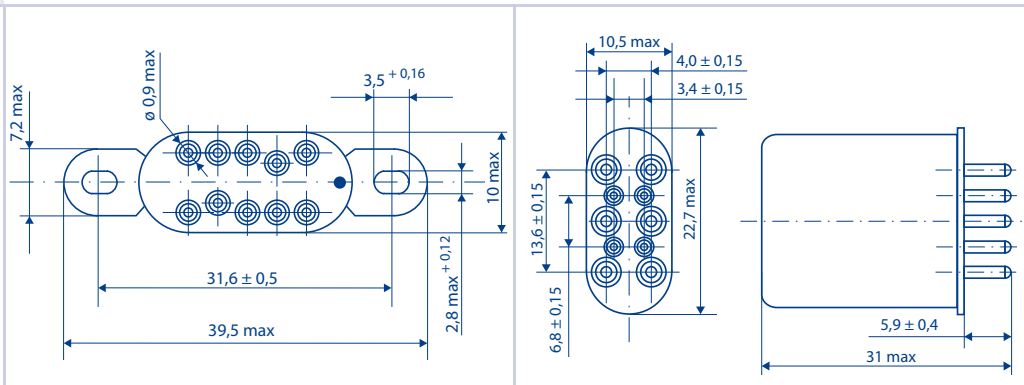
Dielectric Strength and Insulation Resistance

Between Current Carrying Circuits	~500V; 200MOhm	
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Operating Conditions

Temperature, °C	-60 to 60	-60 to 100
Humidity, %	98 at 35°C	
Air Pressure, Pa	$6,66 \cdot 10^2 \div 2,02 \cdot 10^5$	$1,3 \cdot 10^{-4} \div 3 \cdot 10^5$
Vibration Loads, Hz/g	50-2000/15	50 - 1500/20; 1500 - 3000/15
Shock Resistance, g	150 (9 shocks)	



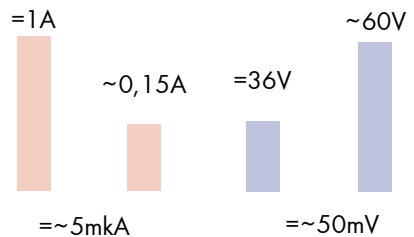
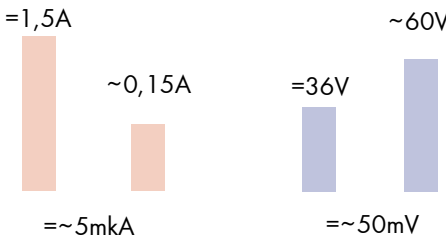
Overall and Connection Dimensions



Circuit Diagram



Electromagnetic Polarized Relays

Relay Type	RPS 45, RPS 45-1	RPS 47
Configuration		
General	2-Position Bistable Relay	
	RPS 45-1 Relay with Surface Mount Terminals	
Package Type	Metal Hermetically Sealed	
Production Format	Mass Production	Mass Production
Weight, g, not More than	3,6	12
Length, Width, Height, mm (Incl. Terminals)	13,5 x 12,5(17,2) x 6,6	17,4 x 17,4 x 10,4(17,3)
Technical Regulations	ЯЛ0.452.081 TV	ЯЛ0.452.093 TV
Contact Parameters		
Contact Number and Contact Type	2 Change-over Contacts	4 Change-over Contacts
Material/Coating	AgPdMg20 - 03/AuCo(99,9)	AuAgMgNi2-97/AuCo(99,9)
Resistance, Ohm	0,25; 0,5	0,25
Operate Time, ms	5	
Maximum Switch Mode (The Number of Switching Cycles)	$\approx 10^{-2} \text{A } 10\text{V } (10^5)$ $= 0,5 \text{A } 36\text{V } (10^5)$ $= 1,0 \text{A } 36\text{V } (10^4)$ $\sim 0,15 \text{A } 60\text{V } (5 \cdot 10^4)$	$\approx 10^{-3} \text{A } 36\text{V } (10^5)$ $= 1,0 \text{A } 10\text{V } (10^5)$ $\sim 0,15 \text{A } 60\text{V } (5 \cdot 10^3)$ $= 1,5 \text{A } 30\text{V } (2 \cdot 10^3)$
Minimum Switch Mode	$\approx 5 \cdot 10^{-6} \text{A } 5 \cdot 10^{-2} \text{V}$	
Switch Mode Tolerance (Switching Voltage and Current Range)	 <p> $= 1 \text{A}$ $\sim 0,15 \text{A}$ $= 36 \text{V}$ $\sim 60 \text{V}$ $\approx 5 \text{mA}$ $\approx 50 \text{mV}$ </p>	 <p> $= 1,5 \text{A}$ $\sim 0,15 \text{A}$ $= 36 \text{V}$ $\sim 60 \text{V}$ $\approx 5 \text{mA}$ $\approx 50 \text{mV}$ </p>

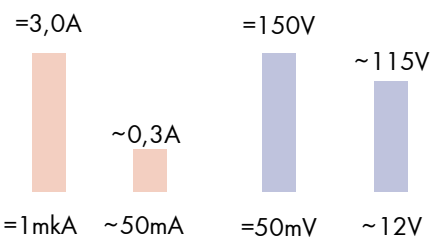
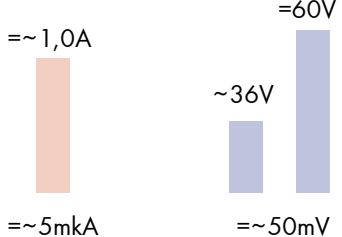


Electromagnetic Polarized Relays

Coil Parameters		
Operating Voltage, V	3; 4; 6,3; 12; 15; 27	15; 24; 27
Resistance, Ohm	9; 17; 43; 150; 220; 800	200; 400; 740
Dielectric Strength and Insulation Resistance		
Between Current Carrying Circuits	~180V; 200MOhm	~220V; 200MOhm
Between Contacts	~300V; 200MOhm	-
Operating Conditions		
Temperature, °C	-60 to 125	
Humidity, %	98 at 35°C	
Air Pressure, Pa	$1,3 \cdot 10^{-6} \div 3,04 \cdot 10^5$	$1,3 \cdot 10^{-4} \div 2,97 \cdot 10^5$
Vibration Loads, Hz/g	0,5 - 1500/30; 1500 - 3000/20	0,5 - 5000/10-35
Shock Resistance, g	150 (9 shocks)	500
Overall and Connection Dimensions		

Electromagnetic Non-Polarized Relays

Relay Type	REK 87		REK 80	REK 81
Configuration				
General	Neutral Monostable Small-Size Relay			
Package Type	Metal Hermetically Sealed			
Production Format	Mass Production		Mass Production	
Weight, g, not More than	9		2,1	
Length, Width, Height, mm (Incl. Terminals)	23 x 13 x 13(18,4)		10,6 x 5,5 x 11(20,65)	10,6 x 5,5 x 11(15,7)
Technical Regulations	ИДЯУ.647611.001 ТУ		ИДЯУ.647611.002. ТУ	

Contact Parameters				
Contact Number and Contact Type	2 Change-over Contacts			
Material/Coating	AgMgNi99/AuCo(99,9)			
Resistance, Ohm	0,6		0,25; 0,5	
Operate/Release Time, ms	5,0/1,5		2,0/1,5	
Maximum Switch Mode (The Number of Switching Cycles)	$=0,5A \ 34V (10^5)$ $=1A \ 34V (5 \cdot 10^4)$ $\sim 0,3A \ 115V (2 \cdot 10^4)$ $=3A \ 34V (2 \cdot 10^3)$		$\sim 0,01A \ 10V (1,5 \cdot 10^5)$ $\sim 0,1A \ 36V (4 \cdot 10^4)$ $=1,0A \ 36V (0,5 \cdot 10^4)$ $\sim 1,0A \ 44V (2 \cdot 10^3)$	
Minimum Switch Mode	$\sim 10^{-6}A \ 5 \cdot 10^{-2}V$		$\sim 5 \cdot 10^{-6}A \ 5 \cdot 10^{-2}V$	
Switch Mode Tolerance (Switching Voltage and Current Range)				
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> ■ Current </div> <div style="text-align: center;"> ■ Voltage </div> </div>	=1mkA	~50mA	=50mV	~12V
			=~5mkA	=~50mV



Electromagnetic Non-Polarized Relays

Coil Parameters		
Operating Voltage, V	6; 12; 27	3; 4; 6,3; 15; 27
Resistance, Ohm	40; 165; 650	30; 55; 105; 610; 1620; 1700
Dielectric Strength and Insulation Resistance		
Between Current Carrying Circuits	~350V; 200MOhm	~180V; 200MOhm
Between Current Carrying Circuits and Package	~500V; 200MOhm	~200V; 200MOhm
Operating Conditions		
Temperature, °C	-60 to 85	-60 to 125
Humidity, %	98 at 35 °C	
Air Pressure, Pa	$1,33 \cdot 10^{-6} \div 3 \cdot 10^5$	
Vibration Loads, Hz/g	50 - 1000/15; 1000 - 3000/12	1-4000/20
Shock Resistance, g	500 (2 shocks)	500 (2 shocks)
Overall and Connection Dimensions		

Electromagnetic Non-Polarized Relays

Relay Type	REP 26	REP 26P
Configuration		
General	Slave Relays	
Package Type	Plastic not Hermetically Sealed	
Production Format	Mass Production	
Weight, g, not More than	70(1-3 contact set) 80(4 contact set)	80
Length, Width, Height, mm (Incl. Terminals)	34 x 29 x 45(57) 34 x 36 x 45(57)	– 34 x 36 x 45(57)
Technical Regulations	ИГФР.647115.069 ТУ	ТУ3425-061-00216823-98
Contact Parameters		
Contact Number and Contact Type	1-4 Set of Make, Break and Change-over Contacts in Various Combinations	2 Twin-Break or 2 Make Contacts, 2 Break or 2 Make Contacts
Material	Ag999,9	
Switching Voltage, V	~5-380; =5-220	~5-220; =5-110
Switching Current, A,(at 55 °C)	0,01-10	0,01-6
Maximum Rated Breaking Current for AC, VA for DC, W	1600 (Inductive Load); 3000(Active Load) 150(Inductive Load); 250(Active Load)	
Life (Cycle Number): Electrical Mechanical	4·10 ⁶ 3·10 ⁷	10 ⁵ 10 ⁷
Operate/Release Time, ms	30/30	



Electromagnetic Non-Polarized Relays

Coil Parameters

Operating Voltage, V	6; 12; 15; 24; 48; 60; 110; 220	24, 48(50), 75, 110
Frequency 50 Hz	12; 24; 40; 110; 220; 230; 240; 380	220
Frequency 60 Hz	12; 24; 40; 110; 220; 230; 240; 380	-
Current, A	0,25; 0,32; 0,4; 0,5; 0,6; 0,8; 1; 1,25; 1,6; 2; 2,5; 3,2; 4; 5; 6	-
Watt-Consumption: for DC with 1-3 Contacts, W	1,5	-
for DC with 4 Contacts, W	2,0	2,0
for AC, VA	3,0	3,0

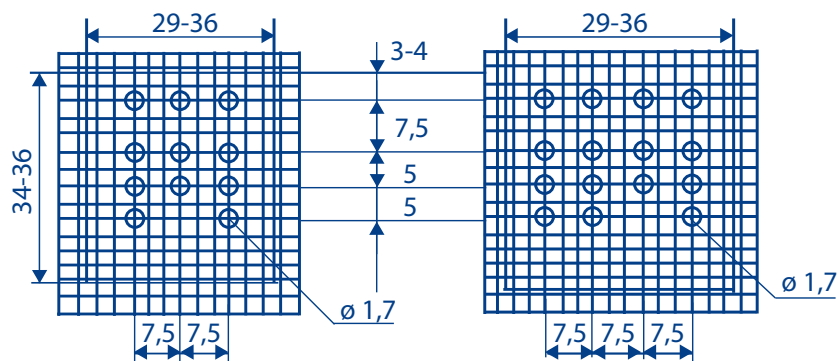
Dielectric Strength and Insulation Resistance

Between Current Carrying Circuits	~2000V; 50MOhm
Between Contacts	~1000V; 50MOhm

Operating Conditions

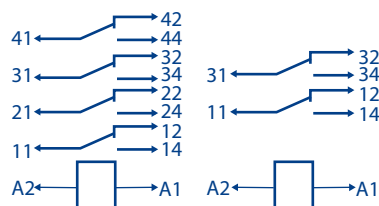
Temperature, °C	-40 to 40	-50 to 60
Humidity, %	98 at 35 °C	100 at 25 °C
Vibration Loads, Hz/g	0,5-100/1	0,5 - 200/2
Shock Resistance, g	3	10

Lining up of Relay Lamellas for Print Mount




Circuit Diagram

Possible Number Combination of Relays with 4 or 2 Change-over Contacts



Time Relays

Relay Type	RDV11
Configuration	
General	Contactless Time-Delay Relays
Package Type	155.15-2
Production Format	Mass Production
Weight, g, not More than	12
Length, Width, Height, mm (Incl. Terminals)	30 x 20 x 5(13)
Technical Regulations	ЯЛ4.544.003 ТУ
Output Circuit Parameters	
Switching Voltage, V	4,5 – 80
Switching Current, A, not More than	0,4
Residual Voltage on Unsealed Relay (at -60°C), V, not More than	0,8 (1,5)
Leakage Current of Unsealed Relay (at 85°C), mA, not More than	0,2 (1,5)



Time Relays

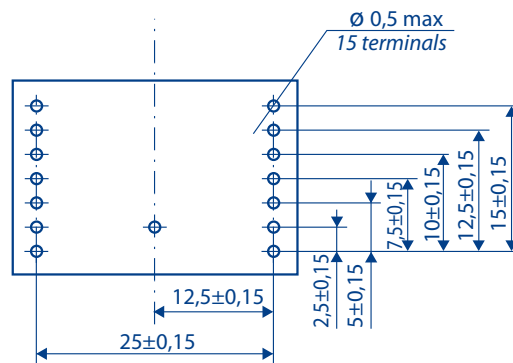
Control Circuit Wiring Parameters

Operating Voltage, V	27 ⁺⁷ ₋₄
Consumption Current, mA, not More than	15
Return to Initial Position, ms, not More than	50
Delay Time, sec	0,05; 0,1; 0,2; 0,3; 0,35; 0,75; 0,5; 1; 1,5; 2; 3; 4; 5; 7; 8; 10; 20; 30; 40; 45; 50; 60; 90; 120; 150; 180; 240; 300; 360; 480; 600; 900; 960; 1200; 1800; 1920; 2400; 3600; 7200
Time-to Failure, h	25000
Derating Operation (T≤55°C, I≤0,2A U≤40B), h	50000

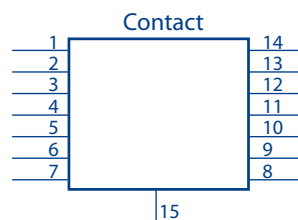
Operating Conditions

Temperature, °C	-60 to 85
Humidity, %	98 at 35 °C
Air Pressure, Pa	$1,3 \cdot 10^{-4} \div 3 \cdot 10^5$
Vibration Loads, Hz/g	1 – 3000/20
Shock Resistance, g	500

Mounting View and Mounting Dimensions



Terminals Function and Position



- 1 - regulator terminal,
- 2 - control,
- 3 - 6, 12, 13 - blank terminals,
- 7 - common leg,
- 8 - common leg in switching circuit,
- 9 - calibration,
- 10 - load,
- 11 - protection,
- 14 - power supply (operating voltage),
- 15 - package.

Static Switching Relays

Relay Type	BKU 1	BKU 2	BKU 3
Configuration			
General	An Electronic Bridge Switch, an Inverter; a Stretcher with an Electrical Input/Output Isolation; Non-Contact Switching Devices		
Package Type	151.15-8	155.15-2	157.29-2
Production Format	Mass Production	Mass Production	Pilot Production
Weight, g, not More than	4	8	16
Length, Width, Height, mm (Incl. Terminals)	19,5 x 14,5 x 5(13)	29,5 x 19,5 x 5(13)	39,5 x 29,5 x 5(13)
Technical Regulations	Br0.344.000 TY	Br0.344.000 TY	Br0.344.000 TY
Output Circuit Parameters			
Switching Current, A	0,005-1,0	0,005-2,0	0,1-4,0
Switching Voltage, V	5-32		
Max. Switching Voltage, V (pulse time=10ms)	43 (50)		
Leakage Current (Sealed Device), mA, not More than	0,06	0,12	1,0
Residual Voltage (Unsealed Device), V, not More than	0,9	0,9	1,12

Static Switching Relays

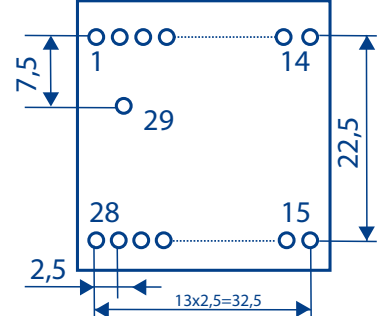
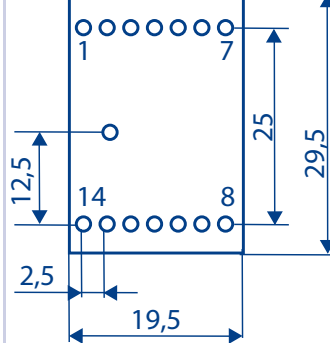
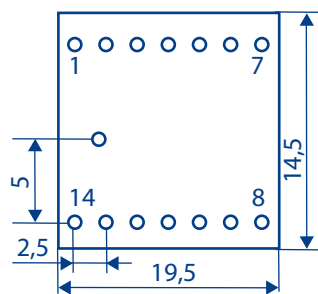
Control Circuit Wiring Parameters

Input Voltage, V:			
Operate		3,1	3,1
Non Operate		1,12	1,32
Input Current, mA:			
Operate		3,4	6,8
Release		0,4	0,8
Operate/Release Time, mcs		9/13	18/22
Coil Resistance Input/ Output, Ohm		10 ⁹	
Quiescent Current Open/ Closed, mA	2/5	3/6	10/20

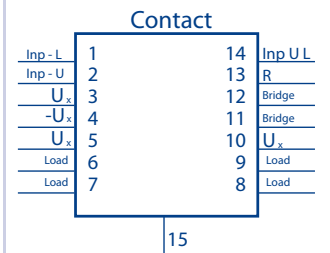
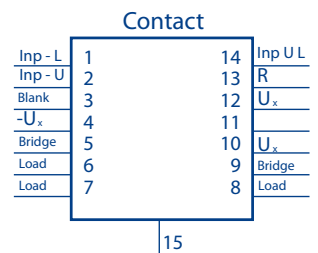
Operating Conditions

Temperature, °C	-60 to 60
Humidity, %	98 at 35 °C
Air Pressure, Pa	$1,3 \cdot 10^{-2} \div 3,03 \cdot 10^5$
Vibration Loads, Hz/g	1-3000/15
Shock Resistance, g	500

Socket Terminal Position



Circuit Schematic Symbols and Terminal Application



Terminal Application:

- 1 - Input current I1
- 2 - Input voltage U2
- 3 - -Input current I2
- 4 - -Input voltage U2
- 5, 6 - -Uc
- 7, 8 - blank
- 9-14 - Load/-Uc
- 15-20 - +Uk /Load
- 21, 23, 26 - +Uc
- 22, 24 - Bridge

Static Switching Relays

Relay Type	BKU 6	BKU 7	BKU 8	BKU 9	BKU 10
Configuration					
General	Electronic Bridge Switch; Overload Current and Thermal Overheat Protection				
Package Type	151.15-8		155.15-2		In-House Manufacture
Production Format	Mass Production		Mass Production		Mass Production
Weight, g, not More than	4		8		40
Length, Width, Height, mm (Incl. Terminals)	19,5 x 14,5 x 5(13)		29,5 x 19,5 x 5(13)		40 x 32 x 9(17)
Technical Regulations	ИДРЮ.640183.001 ТУ				

Input Circuit Parameters					
Switching Current, A, not More than	0,5	1,0	2,0	5,0	10,0
Switching Voltage, V	18-34				
Max. Switching Voltage, V (Pulse Time=10ms)	65				
Leakage Current (sealed device), mA, not More than	0,4	0,8	0,8	1,6	4,0
Residual Voltage (unsealed device), V, not More than	0,2			0,25	
Pick-up Protection Current, A	2	4	8	20	40
Operating Temperature of Thermal Protection, °C	110-125				
Time-to-Failure, h at Temperature ≤ 40°C, h				25000	100000

Static Switching Relays

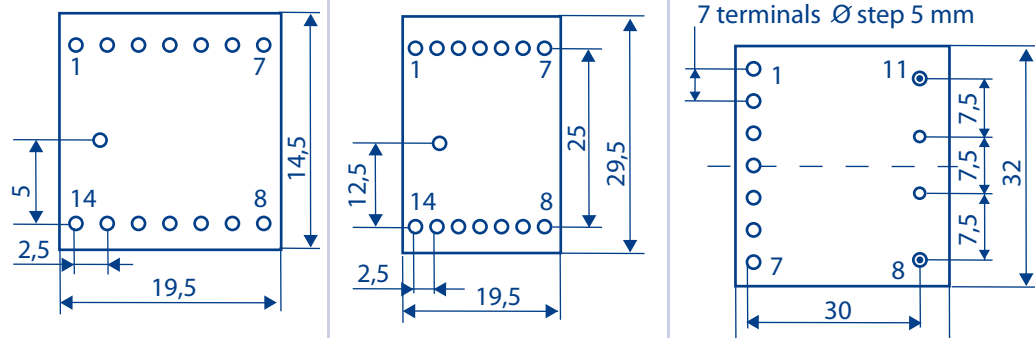
Control Circuit Parameters

Input Voltage, V: Operate Non Operate, not Less than	0,7-1,5 0,6
Input Resistance, Ohm	$(2,5 - 4,5) \cdot 10^3$
Time, max., mcs: Operate, not More than Release, not More than	1,8 8,0

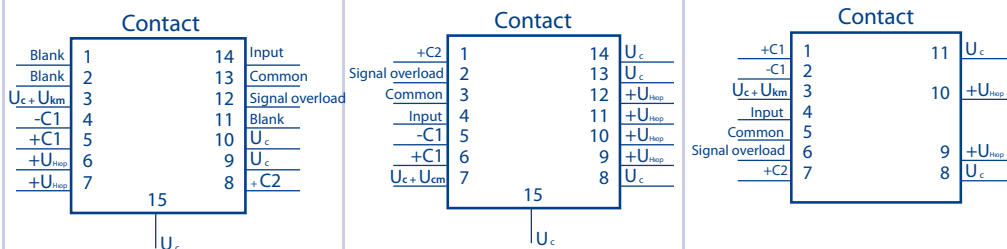
Operating Conditions

Temperature, °C	-60 to 85
Humidity, %	98 at 35 °C
Air Pressure, Pa	$1,03 \cdot 10^{-2} \div 3 \cdot 10^5$
Vibration Loads, Hz/g	1-2500/12
Shock Resistance, g	1000

Socket Terminal Position



Circuit Schematic Symbols and Terminal Application



Mechanical Switches

Product Classification		P2G-3			
Configuration					
General	High-Frequency Wafer Rotary Switch; Close Type Rotary Wafer (1-4) Switch				
Production Format	Mass Production				
Weight, g, not More than	1 Wafer	2 Wafers	3 Wafers	4 Wafers	
	35	43	52	62	
Length, Width, Height, mm	32,2(45,5) x Ø30	43,2(56,5) x Ø30	54,2(67,5) x Ø30	65,2(78,5) x Ø30	
Technical Regulations	ЦЭ0.360.016 ТУ				

Contact Specifications	
Contact Number and Contact Type	2 to 12 Positions 1 to 16 Directions
Material/Coating	Ag99,9/-
Resistance, Ohm	0,02
Switching Current, A	0,05 – 2
Switching Voltage, V	6 – 220
Maximum Switching Power: for DC, W for AC, VA	60 66
Commutation Wear Resistance, Number of Switching Cycles	5000
Contact-to-Contact Capacitance, pf	1



Mechanical Switches

Dielectric Strength and Insulation Resistance

Between Contacts

~1100V; 100MΩ

Operating Conditions

Temperature, °C

-60 to 155

Humidity, %

98 at 40 °C

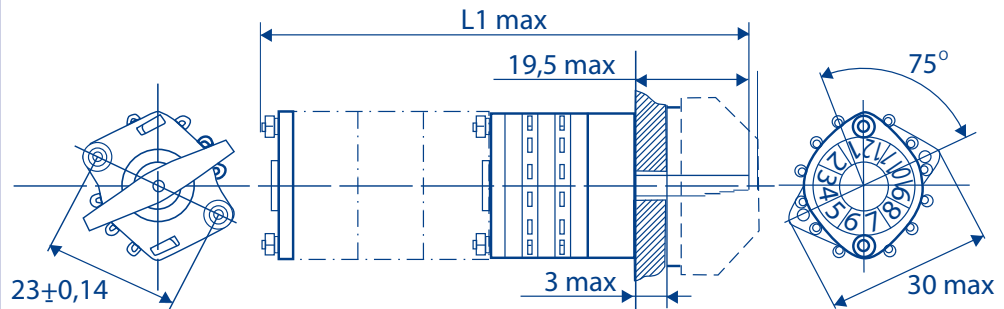
Vibration Loads, Hz/g

1-5000/20

Shock Resistance, g

1000 (single shocks)

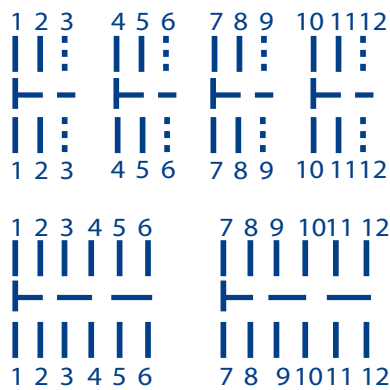
Switch Overall Dimensions



Wafer Number	1	2	3	4
L1 max, mm	45,5	56,5	67,5	78,5

Circuit Diagram

One Wafer Circuit Diagram for 2 and 6 Position Switch



Contact terminals marked by dashed line are non-operating ones

Light Signal Armature Series AVR

Product Classification	TL-1-2	KIPD 35
Configuration		
General	Glow Discharge Indicator	LED
Installation Diameter, mm	16; 22	
Production Format	Mass Production	
Weight, g, not More than	15,5; 19	
Length, Width, Height, mm (Incl. Terminals)	Ø 30x48(62); Ø 30x48(62)	
Technical Regulations	ИДЯУ. 676649. 001 ТУ	

Models

Indicator Type	TL-1-2				KIPD 35			TL-1-2				KIPD 35			
	green	orange	blue	yellow	green	red	yellow	green	orange	blue	yellow	green	red	yellow	
Operating Voltage, V	~ 110 (127)	41013	41011	41012	41014	-	-	-	41023	41021	41022	41024	-	-	-
	~ 220	51013	51011	51012	51014	-	-	-	51023	51021	51022	51024	-	-	-
	~ 380	61013	61011	61012	61014	-	-	-	61023	61021	61022	61024	-	-	-
	= 220	52013	52011	52012	52014	-	-	-	52023	52021	52022	52024	-	-	-
	= 380	62013	62011	62012	62014	-	-	-	62023	62021	62022	62024	-	-	-
	= 6	-	-	-	-	12013	12011	12014	-	-	-	-	12023	12021	12024
	= 12	-	-	-	-	22013	22011	22014	-	-	-	-	22023	22021	22024
	= 24 (27)	-	-	-	-	32013	32011	32014	-	-	-	-	32023	32021	32024
	~ 24 (27)	-	-	-	-	31013	32011	32014	-	-	-	-	31023	32021	32024
	= 48 (50)	-	-	-	-	72013	72011	72014	-	-	-	-	72023	72021	72024



Light Signal Armature Series AVR

Dielectric Strength and Insulation Resistance

Between Contacts

~2500V; 20MΩ

Operating Conditions

Temperature, °C

-60 to 55

Humidity, %

98 at 35 °C

Front Side Protection

IP57 acc to GOST 14255

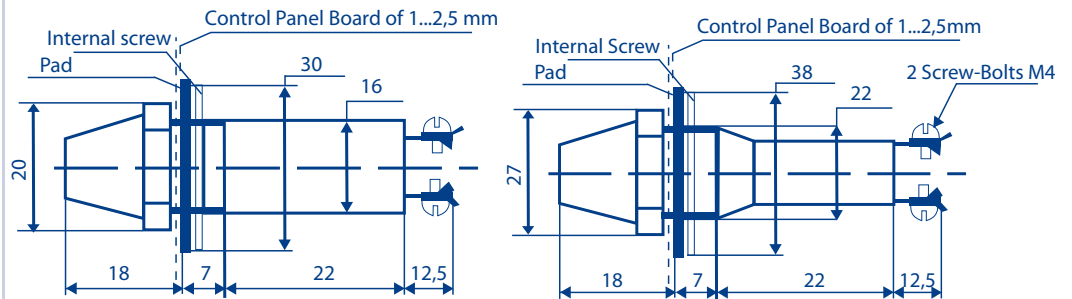
Vibration Loads, Hz/g

0,5-100 / 2

Shock Resistance, g

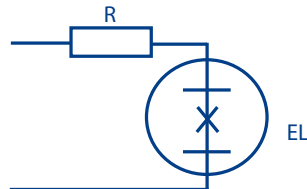
15

Technical Drawing and LSA AVR Arrangement on the Control Panel Board

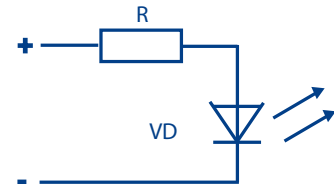


Circuit Diagram

With Glow Discharge Indicator



With LED



Phase Power Regulators

Product Classification

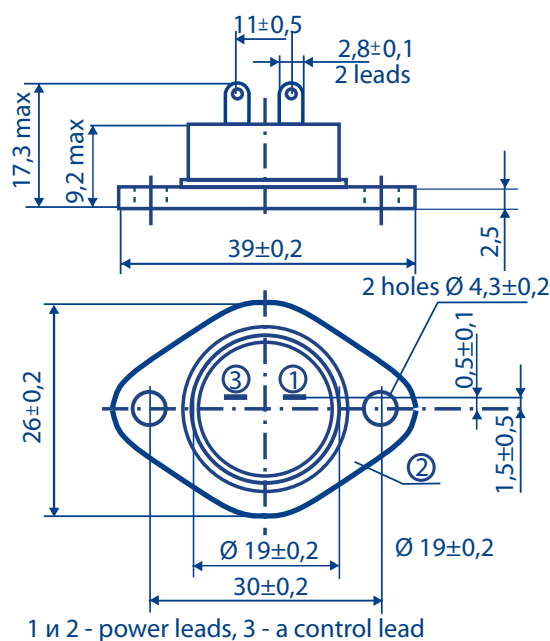
PR 1500

Configuration

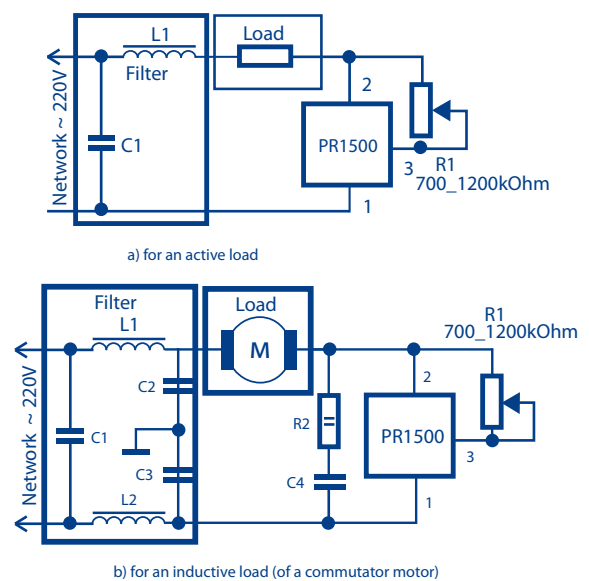


Power Control Limit, % of Rated	0...97
Rated Voltage, V	220±10
Max. Load Current, A	7
Operating Temperature Range, °C	- 45 ... + 85
Load Power, W	60 ... 1500
Max. Voltage Amplitude between Leads 1 and 2, V, not More than	400
Voltage Drop between Leads 1 and 2 at Rated Current, V, not More than	2
Leakage Current in Off-Condition, mA	2
Operability at Momentary Load Current, sec - at 15 A - at 70 A	6 0,02

External and Mounting Dimensions



Connection Diagram



Phase Power Regulators

Product Classification

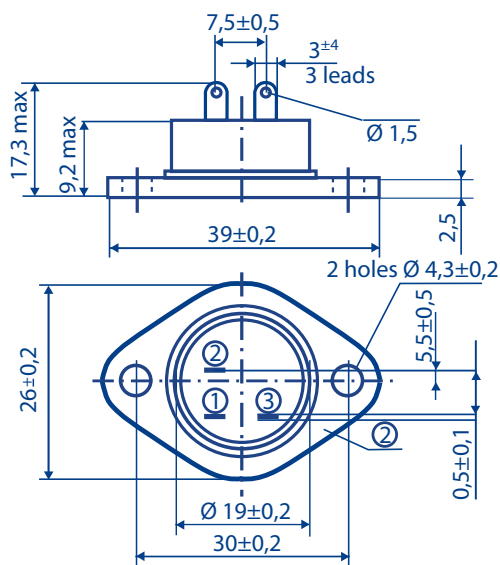
PR 1500i

Configuration

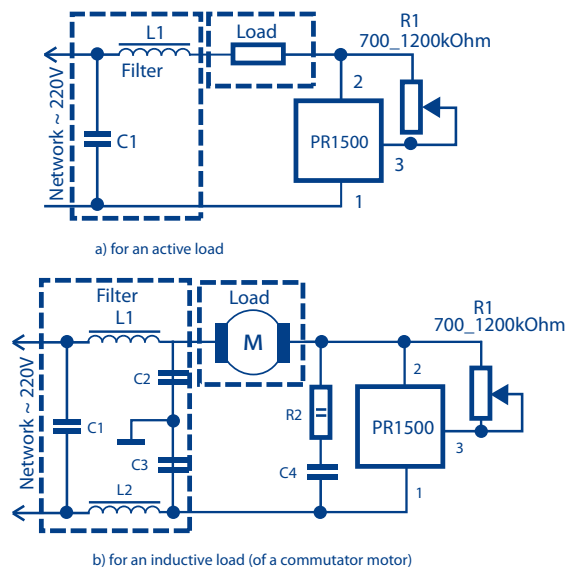


Power Control Limit, % of Rated	0...97
Rated Voltage, V	220±10
Max. Load Current, A	7
Nominal Peak Voltage between Metal Header Package and Terminals, V	1500
Operating Temperature Range, °C	- 45 ... + 85
Load Power, W	60 ... 1500
Max. Voltage Amplitude between Leads 1 and 2, V, not More than	400
Voltage Drop between Leads 1 and 2 at Rated Current, V, not More than	2
Leakage Current in Off-Condition, mA	2
Operability at Momentary Load Current, sec	
- at 15 A	6
- at 70 A	0,02

External and Mounting Dimensions



Connection Diagram



Phase Power Regulators

Product Classification

PR 1500s

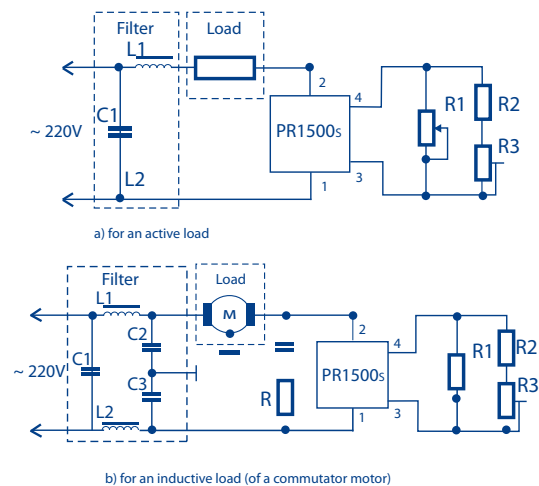
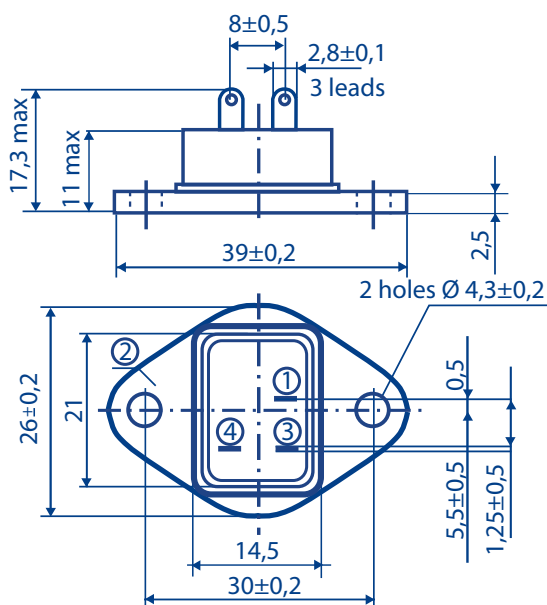
Configuration



Power Control Limit, % of Rated	0...97
Rated Voltage, V	220±10
Max. Load Current, A	7
Operating Temperature Range, °C	- 45 ... + 85
Load Power, W	60 ... 1500
Max. Voltage Amplitude between Leads 1 and 2, V, not More than	400
Voltage Drop between Leads 1 and 2 at Rated Current, V, not More than	2
Leakage Current in Off-Condition, mA	2
Operability at Momentary Load Current, sec - at 15 A - at 70 A	6 0,02

External and Mounting Dimensions

Connection Diagram





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