VARIABLE RATIO RING TRANSFORMERS

General information:

Our variable ratio ring transformers are manufactured according to the currently valid VDE/EN/IEC provisions. They are designed for continuous operation and self-cooling by natural convection. To nominal currents of 2A insulation materials of class E are used; above this class B is used.

Connection and fusing

The grid voltage should not exceed the nominal input voltage given on the rating plate continuously by more than 6% because otherwise a higher winding voltage excessively heats up the contact point of the current collector. The variable ratio ring transformers are designed for frequencies of 50/60Hz and can be operated to 400Hz. We recommend a fuse or an overcurrent circuit breaker on the secondary side for protection against overload or short circuit.

Protective devices on the input side must be sized such that they are not triggered by the inrush current surge. This inrush current surge — due to use of core material of high quality (permeability) — can mainly occur in an unloaded transformer if the switch-on operation is carried out at zero voltage. For low grid impedances an inrush current up to 20 x (IN) can be reached in the respective half-wave (10ms at 50Hz).

Hence on the input side slow-acting fuses are to be provided.

Installation and cooling

Operation with the rated power is possible at a maximum ambient temperature of 40°C and up to a height of 1000m above sea level.

For installation in an enclosure self-heating of the variable transformer and any other heat-radiating devices must not lead to inside temperatures higher than 40°C. If the ambient temperature exceeds 40°C, the variable transformer must be cooled externally via fans or the nominal current must be reduced by 20% per 10K temperature rise.

Maintenance

This is limited to elimination of contamination on the contact track and inspection of the current collectors for smooth running.

Every approx. 6 months - longer or shorter depending upon operating conditions - the variable transformer must be maintained as follows:

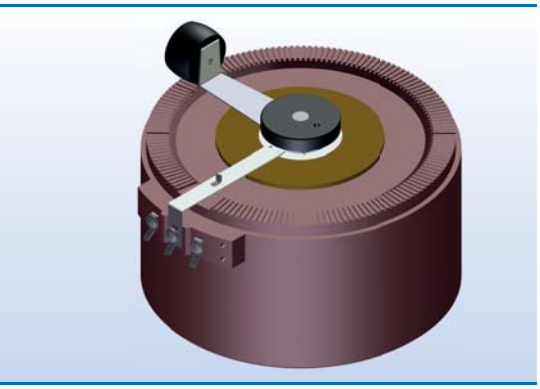
Dust on contact track must be removed by brush or blowing off.

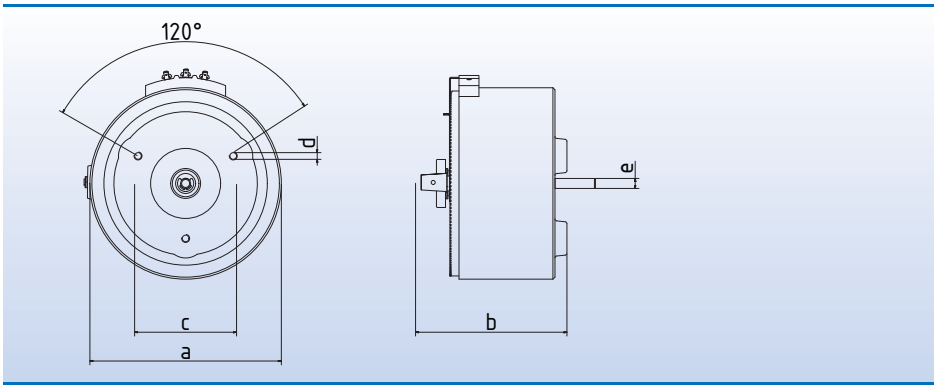
The contact track can be wiped off with a cloth dipped in spirit. Black smooth tracks on the contact track coming from the contact roll do not cause any harm, however. An oxide layer caused by overload or an agressive atmosphere must be removed via a fine sandpaper and the grinding dust must be removed.

Carbon rolls must not be out of round and must be able to be rotated easily when the current collector is adjusted.

Jammed, out-of-round or damaged carbon rolls must be replaced.

The carbon roll bearing must not be lubricated!





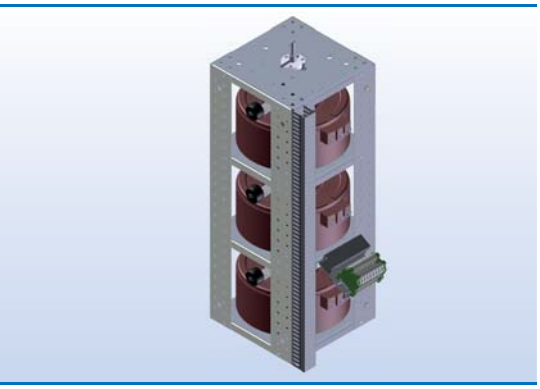
Single-phase variable ratio ring auto-transformers according to VDE 0552/69

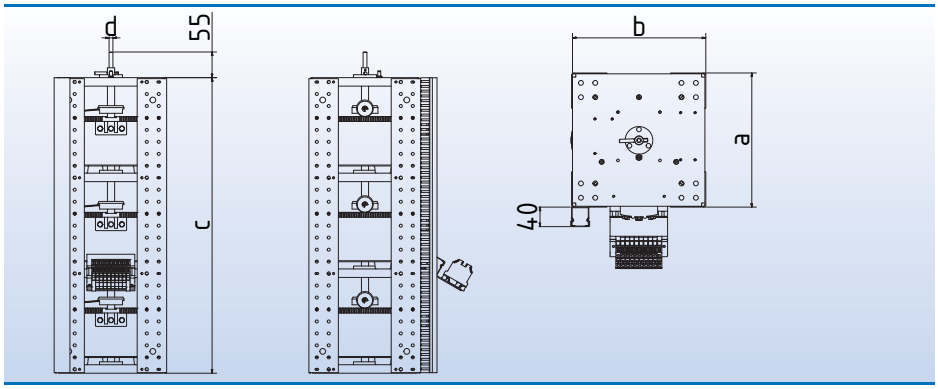
Design:

Open frame, stationary, for device installation and assembly in dry rooms, windings in autotransformer connection, connection to screw terminals. 3-point front fastening, size 65-95 central fastening.
IP 00, to 2A insulation class E, above: insulation class B, max. ambient temperature of 40°C (ta40°C/B).
Version with separate winding available upon request.

Type	Current A	230V 0-230V Item no:	Current A	230V 0-260V Item no:	Current A	230V 0-300V Item no:	Current A	400V 0-400V Item no:
RRSP	1,00	0185-00000**65**	0,50	0186-00000**65**	1,00	0187-00000**94**	0,80	0188-00000**94**
RRSP	1,25	0185-00000**75**	0,80	0186-00000**75**	1,25	0187-00000**95**	1,00	0188-00000**95**
RRSP	2,00	0185-00000**85**	1,00	0186-00000**85**	1,60	0187-00000**114**	1,60	0188-00000**114**
RRSP	2,50	0185-00000**94**	1,60	0186-00000**94**	2,00	0187-00000**115**	2,00	0188-00000**115**
RRSP	3,20	0185-00000**95**	2,00	0186-00000**114**	3,20	0187-00000**116**	2,50	0188-00000**116**
RRSP	4,00	0185-00000**114**	4,00	0186-00000**115**	5,00	0187-00000**136**	4,00	0188-00000**136**
RRSP	5,00	0185-00000**115**	5,00	0186-00000**116**	6,30	0187-00000**157**	5,00	0188-00000**137**
RRSP	6,30	0185-00000**116**	6,30	0186-00000**136**	8,00	0187-00000**178**	6,30	0188-00000**157**
RRSP	8,00	0185-00000**136**	8,00	0186-00000**137**	10,00	0187-00000**218**	8,00	0188-00000**178**
RRSP	10,00	0185-00000**137**	10,00	0186-00000**157**	12,50	0187-00000**257**	10,00	0188-00000**217**
RRSP	12,50	0185-00000**157**	12,50	0186-00000**178**	16,00	0187-00000**258**	12,50	0188-00000**257**
RRSP	16,00	0185-00000**178**	16,00	0186-00000**218**	20,00	0187-00000**298**	16,00	0188-00000**258**
RRSP	20,00	0185-00000**217**	20,00	0186-00000**258**	25,00	0187-00000**358**	20,00	0188-00000**358**
RRSP	25,00	0185-00000**257**	25,00	0186-00000**297**	32,00	0187-00002**912**	25,00	0188-00002**512**
RRSP	32,00	0185-00002**507**	40,00	0186-00002**512**	63,00	0187-00003**515**	40,00	0188-00002**912**
RRSP	40,00	0185-00002**907**	50,00	0186-00002**912**			50,00	0188-00003**515**
RRSP	50,00	0185-00002**512**	63,00	0186-00003**515**				
RRSP	63,00	0185-00002**912**						
RRSP	100,00	0185-00003**515**						

Type	Copper kg	Total kg	Dimensions approx. in mm a	b	c	d	e
RRSP 65	0,040	1,20	74	75	26	M4	6
RRSP 75	0,070	1,50	86	75	26	M4	6
RRSP 85	0,120	2,00	96	76	26	M4	6
RRSP 94	0,160	2,20	106	68	26	M4	6
RRSP 95	0,250	2,60	106	78	26	M4	6
RRSP 114	0,300	3,30	131	90	80	M6	6
RRSP 115	0,370	4,00	131	105	80	M6	6
RRSP 116	0,450	4,70	131	115	80	M6	6
RRSP 136	0,900	6,20	148	120	110	M8	10
RRSP 137	1,000	7,30	148	130	110	M8	10
RRSP 157	1,200	9,30	170	130	110	M8	10
RRSP 178	1,600	13,00	190	150	110	M8	10
RRSP 217	2,150	16,00	230	155	150	M8	10
RRSP 218	2,250	17,00	230	165	150	M8	10
RRSP 257	3,150	19,00	270	155	150	M8	10
RRSP 258	3,300	21,00	280	165	150	M8	10
RRSP 297	4,500	21,00	320	160	150	M8	10
RRSP 298	4,800	28,00	320	180	150	M8	10
RRSP 358	5,600	34,00	390	180	150	M10	10
RRSP 2507	3,250	20,00	270	210	150	M8	10
RRSP 2907	4,500	26,00	315	225	150	M8	10
RRSP 2512	6,000	39,00	270	270	150	M8	10
RRSP 2912	8,000	46,00	315	280	150	M8	10
RRSP 3515	10,000	78,00	385	350	150	M10	10





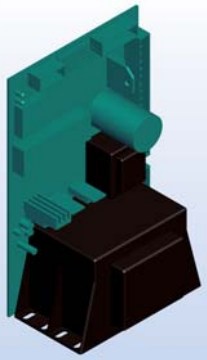
Three-phase variable ratio ring autotransformers according to VDE 0552/69

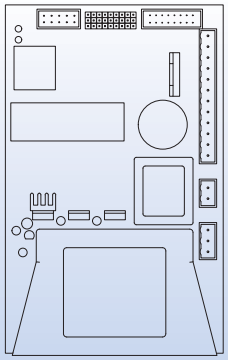
Design:

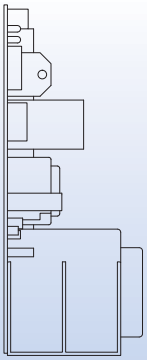
Open frame, stationary, for device installation and assembly in dry rooms, windings in autotransformer connection, connection to screw terminals.
IP 00, to 2A insulation class E, above: insulation class B,
max. ambient temperature 40°C (ta40°C/B).
Higher currents, other voltages or version with separate winding available upon request.

Type	Current 3 x A	3 x 400V 3 x 0-400V Item no:	Current 3 x A	3 x 400V 3 x 0-450V Item no:	Current 3 x A	3 x 400V 3 x 0–520V Item no:
RDRSP 73	0,8	0189-00000073	–	–	–	–
RDRSP 74	1,0	0189-00000074	0,5	0190-00000074	–	–
RDRSP 84	1,6	0189-00000084	0,8	0190-00000084	–	–
RDRSP 94	2,5	0189-00000094	1,6	0190-00000094	1,0	0191-00000094
RDRSP 95	3,2	0189-00000095	2,0	0190-00000095	1,25	0191-00000095
RDRSP 114	4,0	0189-00000114	–	–	1,6	0191-00000114
RDRSP 115	5,0	0189-00000115	4,0	0190-00000115	2,0	0191-00000115
RDRSP 116	6,3	0189-00000116	5,0	0190-00000116	2,5	0191-00000116
RDRSP 136	8,0	0189-00000136	6,3	0190-00000136	5,0	0191-00000136
RDRSP 137	10,0	0189-00000137	8,0	0190-00000137	–	–
RDRSP 157	12,5	0189-00000157	10,0	0190-00000157	6,3	0191-00000157
RDRSP 178	16,0	0189-00000178	12,5	0190-00000178	8,0	0191-00000178
RDRSP 217	20,0	0189-00000217	–	–	–	–
RDRSP 257	25,0	0189-00000257	–	–	12,5	0191-00000257
RDRSP 2507	32,0	0189-00002507	–	–	–	–
RDRSP 2907	40,0	0189-00002907	–	–	–	–
RDRSP 2512	50,0	0189-00002512	40,0	0190-00002512	–	–
RDRSP 2912	63,0	0189-00002912	50,0	0190-00002912	32,0	0191-00002912
RDRSP 3515	100,0	0189-00003515	63,0	0190-00003515	63,0	0191-00003515

Type	Copper kg	Total kg	Dimensions approx. in mm			
			a	b	c	d
RDRSP 73	0,11	5,5	155	155	300	6
RDRSP 74	0,12	5,8	155	155	300	6
RDRSP 84	0,27	6,7	155	155	300	6
RDRSP 94	0,48	7,9	155	155	300	6
RDRSP 95	0,75	9,5	155	155	320	6
RDRSP 114	0,90	11,5	175	175	330	6
RDRSP 115	1,11	14,0	175	175	360	6
RDRSP 116	1,35	16,5	175	175	390	6
RDRSP 136	2,70	24,0	240	240	435	10
RDRSP 137	3,00	27,0	240	240	485	10
RDRSP 157	3,60	30,0	240	240	485	10
RDRSP 178	4,80	44,0	260	260	535	10
RDRSP 217	6,50	55,0	240	240	618	10
RDRSP 257	9,50	66,0	315	315	618	10
RDRSP 2507	9,80	70,0	390	390	695	10
RDRSP 2907	13,50	88,0	390	390	695	10
RDRSP 2512	18,00	140,0	390	390	920	10
RDRSP 2912	24,00	160,0	390	390	920	10
RDRSP 3515	32,40	260,0	405	405	1070	10



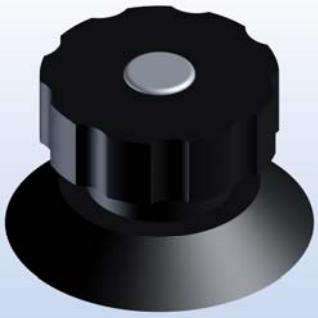


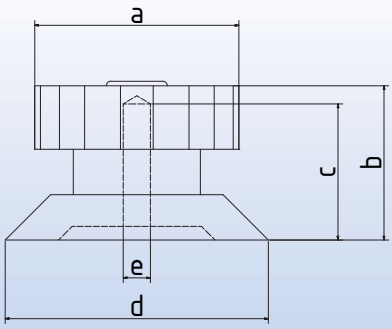


Design:

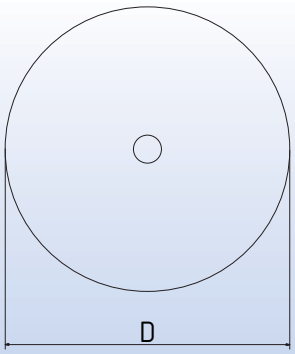
Various motor drives and controls are available as options for all single- and three-phase variable ratio ring transformers. Please specify clearly when ordering. Please be aware that the dimensions are different for versions with motor and control card. Please contact us directly for these.
Additional options and versions upon request.

Type	Description
AC-motor	AC motor 230VAC. (control via, e.g., on/off button)
DC-motor	DC motor with control card with external actual value (control via potentiometer or 0-10VDC)
DC motor with control card	DC motor with control card with internal actual value (control via potentiometer or 0-10VDC)
Interface	RS232/485 interface for control card

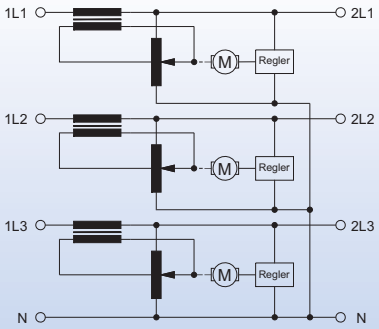


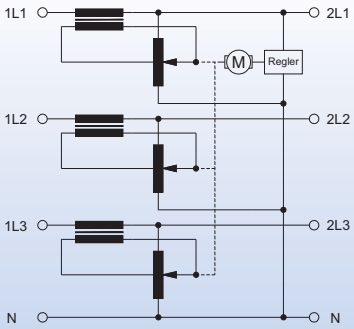


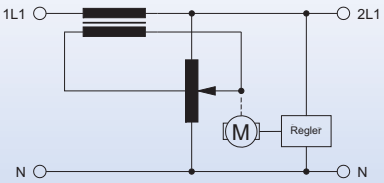
Type	Item no:	Dimensions approx. in mm				
		a	b	c	d	e
REK 30–40–6	0084-00000001	38	28	12	41	6
REK 30-60–6	0084-00000002	48	34	28	58	6
REK 30-60-10	0084-00000003	48	34	28	58	10
REK 30-90-6	0084-00000004	76	40	28	90	6
REK 30-90-10	0084-00000005	76	40	28	90	10



Type	Item no:	Diameter mm	Label
RES 31-60-100	0085-00000001	60	0-100%
RES 31-60-230	0085-00000002	60	0-230V
RES 31-90-100	0085-00000003	92	0-100%
RES 31-90-230	0085-00000004	92	0-230V
RES 31-130-100	0085-00000005	132	0-100%
RES 31-130-230	0085-00000006	132	0-230V







Single-phase and 3-phase voltage stabiliser according to VDE 0552/69

RSKH in output range from 1kVA:

Riedel RSKH voltage stabilisers are used as line-side (upstream) series elements in grids with fluctuating voltages. At the output of the voltage stabiliser a constant voltage which is independent of fluctuations in the grid is available to the consumer.

Design:

Riedel voltage stabilisers consist of a variable transformer with motor drive and a booster transformer as well as an electronic controller. As soon as this controller records a voltage deviation from the set point on the output of the stabiliser the motor of the variable transformers becomes activated by the controller and a voltage is induced in the primary winding of the booster transformer. As a result the secondary winding adds or subtracts voltage to or from the grid. This continues until the output voltage corresponds to its set point.

The controller itself works as a proportional control amplifier with PI control and is located on a plug-in card which contains the power supply unit and the actual value processing unit. The set point setting for adaptation to the dynamic behavior of the control path is made via multi-turn trimmer. The motor of the variable transformer is controlled in a contactless manner, with the adjustment speed dependent upon the nominal voltage (i.e. high control speed at high deviation and low control speed at low deviation). This yields a high control accuracy without control oscillations.

Technical data:

Nominal input voltages:	all typical low-voltage grids
Grid voltage fluctuations:	e.g. ±10%, ±15%, ±20%...
Grid frequency:	50/60 Hz or 400 Hz
Output precision:	±1%
Loading type:	ohmic, inductive or capacitive
Efficiency:	98-99% depending upon controller type
Duty cycle:	S1 Operation (100%)
Protection class:	IP 00

Main applications:

machine controls	data processing systems
test field and laboratory	medical electronics
monitoring systems	remote signalling systems
process controls	remote controls
air traffic controls	furnace heaters

Possible options:

Protection class to max. IP 65, analogue or digital measuring instruments, main switch and fuse, galvanic separation, maintenance service etc.

Principle schematic:

see above: 3-phase AC grid with single-phase control, 3-phase AC grid with master control, single-phase grid (from left to right)