RHM International
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THE NEW STATE OF THE ART IN HV BUSHINGS

Reliable, Explosion-free High-Voltage Bushings That Never Need Maintenance

THE RIF® ADVANTAGES - Safe and reliable bushing technology.

We are enabling total safety for lower risk and cost of ownership.

ISO 9001 Certified We have more than 40 years of HV T&D technology experience.

Built on the proven concept of finely graded condenser insulations, our high voltage transformer bushings' patented core insulation is composed of fiberglass impregnated with epoxy resin cleverly layered between capacitance screens while the outer insulation is exclusively featuring silicone rubber, compounding a uniquely stress-free paperless core insulation with superior pollution and climate resistance.

Introduced in 2002 with immediate success, RIF® bushings have triggered a whole new phase of high voltage bushing technology in the industry.

Those proprietary RIF® bushings don't feature any gap or open cavity in their paperless structure. They are totally solid and dry.

As a result, there isn't any interstitial insulating filler in any open space between capacitive cores and outer insulators. Freed from critical seals the insulation configuration is then better waterproofed by design and related manufacturing processes are much simplified. This simplicity translates into robustness, reliability, safety and shorter lead times.

Consequently the RIF® technology delivers four major improvements:

A totally dry type paperless condenser structure with superior electrical performance and a uniform electrical field profile along the bushing.

Long-term sustainability of performance under multidimensional operational stresses. No specific long term storage conditions needed.

A remarkable resistance to mechanical and seismic shocks as well as thermal stresses.

A core insulation condition that can be monitored in real time thanks to a unique and safe built-in tap (option).

This provides our customers with key benefits:

- Long term steady operation with very low and consistently stable PD and tanδ values
- Discretionary maintenance, explosion-free and environmentally-friendly operation in extreme operational conditions (thermal, climatic, pollution, mechanical) for long term reliability, lower cost of ownership and increased transformer reliability and uptime
- Lower spare parts inventory thanks to shorter lead times combined with higher reliability
- Strengthened protection of assets by leveraging smart bushings that can continuously monitor the insulation's condition thus protecting host power transformer from critical damage that would be generated by a failing bushing

BENEFITS

All products are developed and manufactured in an ISO 9001 certified plant. Quality is central to all aspects of our technologies and processes.

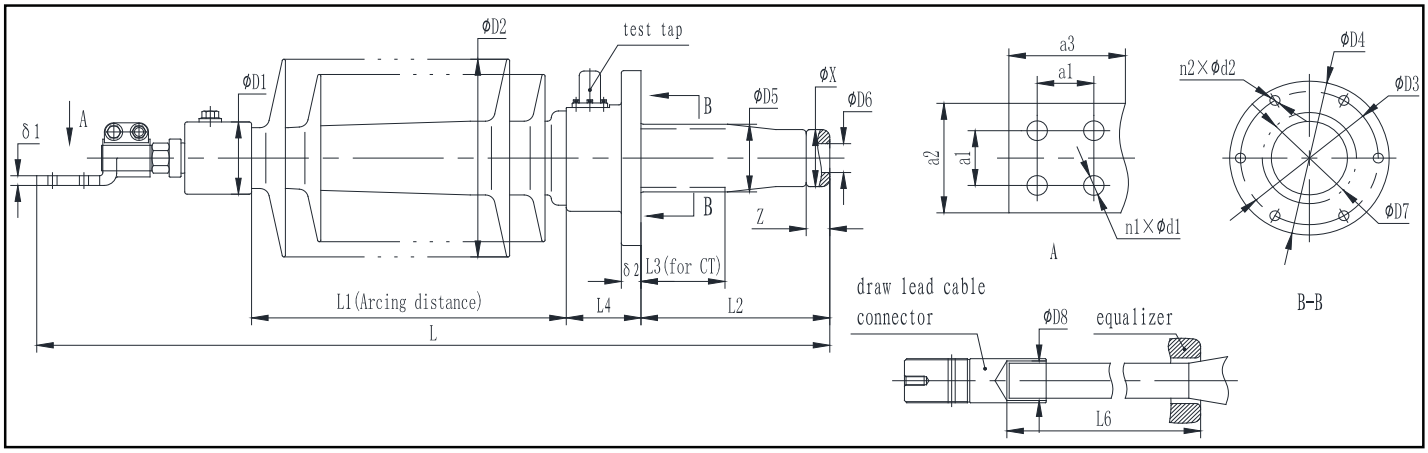
In short, the RIF® technology uniquely reduces risks for power transformer operators along with their total costs of ownership. Available up to 245kV.

Ultra-reliable. Ultra-safe. Up to 345kV. RIF®: the fully dry transformer bushing technology that leaves less room for error.

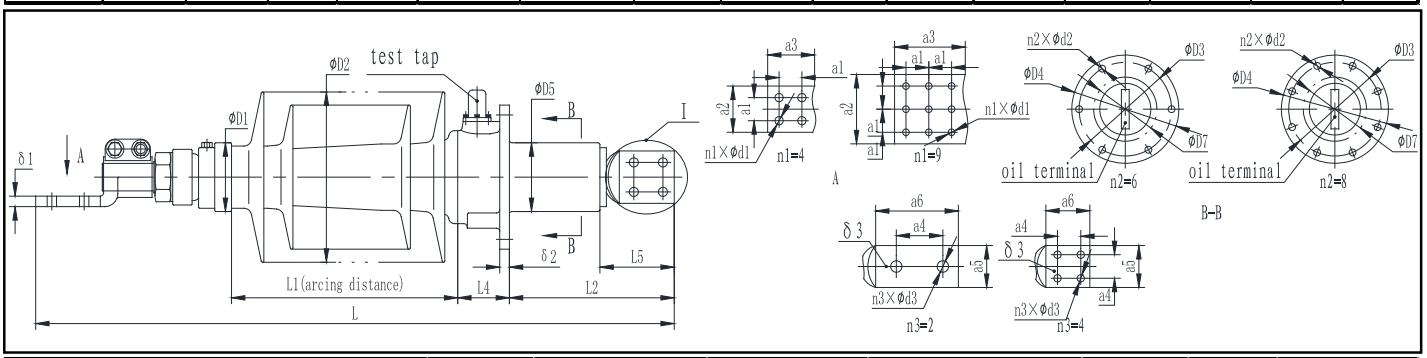
PRODUCT SPECIFICATION OUTLINE & TABLE

Outline Drawing for RIF® Bushings (nominal system voltage through 52kV)

The main mounting dimensions are typically defined for each user- the dimensions listed below are typical dimensions only.



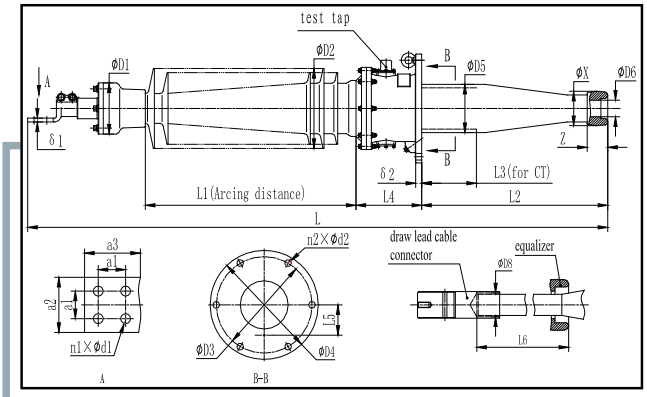
Code	Voltage	Current	Total length	Upper terminal			Mounting flange		Dimensions on oil side			Equalizer		Inner tube diameter	Mass
				Hole spacing	Terminal plate size	Number of holes × hole diameter	Hole distance	Number of holes × hole diameter	Length	Space for CT	Core diameter	Height	Diameter		
			L	a1	a2×a3	n1×Φd1	D3	n2×Φd2	L2	L3	D5	Z	X	D6	
	kV	A	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
TR1434	34.5	1250	903	40	80×85	4×Φ14	190	6×Φ14	170	0	108	30	90	55	30
TR1243	34.5	1250	1053	40	80×85	4×Φ14	190	6×Φ14	320	150	108	30	90	55	35
TR1244	34.5	1250	1153	40	80×85	4×Φ14	190	6×Φ14	420	250	108	30	90	55	35
TR1245	34.5	1250	1303	40	80×85	4×Φ14	190	6×Φ14	570	400	108	30	90	55	40
TR1473	52	1250	1028	40	80×85	4×Φ14	210	8×Φ14	200	0	120	30	90	55	35
TR1474	52	1250	1178	40	80×85	4×Φ14	210	8×Φ14	350	150	120	30	90	55	40
TR1475	52	1250	1278	40	80×85	4×Φ14	210	8×Φ14	450	250	120	30	90	55	40
TR1476	52	1250	1428	40	80×85	4×Φ14	210	8×Φ14	600	400	120	30	90	55	45

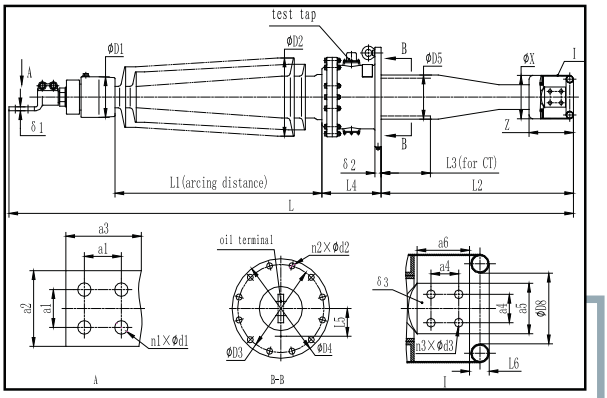


Code	Voltage	Current	Total length	Upper terminal			Mounting flange		Dimensions on oil side		Lower terminal				Mass
				Hole spacing	Terminal plate size	Number of holes × hole diameter	Hole distance	Number of holes × hole diameter	Length	Core diameter	Hole spacing	Terminal plate size	Number of holes × hole diameter	Metal parts length	
			L	a1	a2×a3	n1×Φd1	D3	n2×Φd2	L2	D5	a4	a5×a6	n3×Φd3	L5	
	kV	A	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
TR1437a	34.5	1250	957	40	80×85	4×Φ14	190	6×Φ14	240	108	45	40×80	2×Φ14	100	40
TR1439	34.5	2000	1018	50	100×105	4×Φ18	190	6×Φ14	255	108	45	80×85	4×Φ14	115	40
TR1441	34.5	3150	1023	50	100×105	4×Φ18	190	6×Φ14	255	108	45	80×85	4×Φ14	115	45
TR1477	34.5	4000	1133	50	150×155	9×Φ18	210	8×Φ14	280	130	45	100×100	4×Φ14	140	55
TR1478	34.5	5000	1133	50	150×155	9×Φ18	210	8×Φ14	280	130	45	100×100	4×Φ14	140	65
TR1480a	52	1250	1082	40	80×85	4×Φ14	210	8×Φ14	270	120	45	40×80	2×Φ14	100	40
TR1481	52	2000	1143	50	100×105	4×Φ18	210	8×Φ14	285	120	45	80×85	4×Φ14	115	45
TR1237	52	3150	1148	50	100×105	4×Φ18	210	8×Φ14	285	120	45	80×85	4×Φ14	115	50
TR1238	52	4000	1258	50	150×155	9×Φ18	230	8×Φ14	310	140	45	100×100	4×Φ14	140	60
TR1239	52	5000	1258	50	150×155	9×Φ18	230	8×Φ14	310	140	45	100×100	4×Φ14	140	70

PRODUCT SPECIFICATION OUTLINE & TABLE

Outline Drawing for RIF® Bushings (nominal system voltage from 72.5 kV to 245kV)





Code	Voltage	Current	Total length	Upper terminal			Mounting flange		Dimensions on oil side			Equalizer		Inner tube diameter	Mass
				Hole spacing	Terminal plate size	Number of holes × hole diameter	Hole distance	Number of holes × hole diameter	Length	Space for CT	Core diameter	Height	Diameter		
			L	a1	a2×a3	n1×Φd1	D3	n2×Φd2	L2	L3	D5	Z	X	D6	
	kV	A	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
TR464b	72.5	1250	1710	50	100×105	4×Φ18	280	6×Φ18	285	0	140	75	125	60	65
TR466b	72.5	1250	2110	50	100×105	4×Φ18	280	6×Φ18	685	400	140	75	125	60	70
TR1110a	72.5	1600	1720	50	100×105	4×Φ18	280	6×Φ18	285	0	140	75	125	60	65
TR1112a	72.5	1600	2120	50	100×105	4×Φ18	280	6×Φ18	685	400	140	75	125	60	70
TR567b	123	1250	2740	50	100×105	4×Φ18	350	6×Φ24	825	400	175	75	125	60	115
TR568b	123	1250	2890	50	100×105	4×Φ18	350	6×Φ24	975	550	175	75	125	60	120
TR575b	123	1600	2750	50	100×105	4×Φ18	350	6×Φ24	825	400	175	75	125	60	115
TR576b	123	1600	2900	50	100×105	4×Φ18	350	6×Φ24	975	550	175	75	125	60	120
TR1272	145	1250	3000	50	100×105	4×Φ18	350	6×Φ24	885	400	185	75	125	60	130
TR1273	145	1250	3150	50	100×105	4×Φ18	350	6×Φ24	1035	550	185	75	125	60	135
TR1280	145	1600	3010	50	100×105	4×Φ18	350	6×Φ24	885	400	185	75	125	60	130
TR1281	145	1600	3160	50	100×105	4×Φ18	350	6×Φ24	1035	550	185	75	125	60	135
TR1303	170	1250	3240	50	100×105	4×Φ18	400	8×Φ24	925	400	210	75	125	60	165
TR1304	170	1250	3390	50	100×105	4×Φ18	400	8×Φ24	1075	550	210	75	125	60	175
TR1311	170	1600	3250	50	100×105	4×Φ18	400	8×Φ24	925	400	210	75	125	60	165
TR1312	170	1600	3400	50	100×105	4×Φ18	400	8×Φ24	1075	550	210	75	125	60	175
TR1458	245	1250	4315	50	100×105	4×Φ18	500	12×Φ24	950	200	290	110	≤260	≥60	370
TR1460	245	1250	4615	50	100×105	4×Φ18	500	12×Φ24	1250	500	290	110	≤260	≥60	410
TR1335	245	1600	4325	50	100×105	4×Φ18	500	12×Φ24	950	200	290	110	≤260	≥60	370
TR1337	245	1600	4625	50	100×105	4×Φ18	500	12×Φ24	1250	500	290	110	≤260	≥60	410

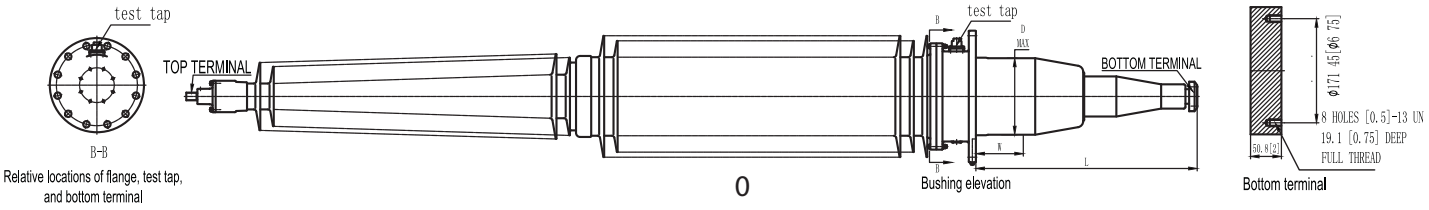
Code	Voltage	Current	Total length	Upper terminal			Mounting flange		Dimensions on oil side			Equalizer		Lower terminal		
				Hole spacing	Terminal plate size	Number of holes × hole diameter	Hole distance	Number of holes × hole diameter	Length	Space for CT	Core diameter	Height	Diameter	Hole spacing	Terminal plate size	Number of holes × hole diameter
			L	a1	a2×a3	n1×Φd1	D3	n2×Φd2	L2	L3	D5	Z	X	a4	a5×a6	n3×Φd3
	kV	A	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
TR1060	72.5	2000	1815	50	100×105	4×Φ18	280	6×Φ18	390	0	140	180	172	45	80×85	4×Φ14
TR1062	72.5	2000	2215	50	100×105	4×Φ18	280	6×Φ18	790	400	140	180	172	45	80×85	4×Φ14
TR1254	72.5	2500	1840	60	125×130	4×Φ18	280	6×Φ18	390	0	140	180	172	45	80×85	4×Φ14
TR1256	72.5	2500	2240	60	125×130	4×Φ18	280	6×Φ18	790	400	140	180	172	45	80×85	4×Φ14
TR1070	123	2000	2845	50	100×105	4×Φ18	350	6×Φ24	930	400	175	180	172	45	80×85	4×Φ14
TR1071	123	2000	2995	50	100×105	4×Φ18	350	6×Φ24	1080	550	175	180	172	45	80×85	4×Φ14
TR1264	123	2500	2870	60	125×130	4×Φ18	350	6×Φ24	930	400	175	180	172	45	80×85	4×Φ14
TR1265	123	2500	3020	60	125×130	4×Φ18	350	6×Φ24	1080	550	175	180	172	45	80×85	4×Φ14
TR1283	145	2000	3105	50	100×105	4×Φ18	350	6×Φ24	990	400	185	180	172	45	80×85	4×Φ14
TR1284	145	2000	3255	50	100×105	4×Φ18	350	6×Φ24	1140	550	185	180	172	45	80×85	4×Φ14
TR1291	145	2500	3130	60	125×130	4×Φ18	350	6×Φ24	990	400	185	180	172	45	80×85	4×Φ14
TR1292	145	2500	3280	60	125×130	4×Φ18	350	6×Φ24	1140	550	185	180	172	45	80×85	4×Φ14
TR1319	170	2000	3345	50	100×105	4×Φ18	400	8×Φ24	1030	400	210	180	172	45	80×85	4×Φ14
TR1320	170	2000	3495	50	100×105	4×Φ18	400	8×Φ24	1180	550	210	180	172	45	80×85	4×Φ14
TR1327	170	2500	3370	60	125×130	4×Φ18	400	8×Φ24	1030	400	210	180	172	45	80×85	4×Φ14
TR1328	170	2500	3520	60	125×130	4×Φ18	400	8×Φ24	1180	550	210	180	172	45	80×85	4×Φ14
TR1345	245	2000	4405	50	100×105	4×Φ18	500	12×Φ24	1040	200	290	200	≤260	45	80×85	4×Φ14
TR1347	245	2000	4705	50	100×105	4×Φ18	500	12×Φ24	1340	500	290	200	≤260	45	80×85	4×Φ14
TR1355	245	2500	4430	60	125×130	4×Φ18	500	12×Φ24	1040	200	290	200	≤260	45	80×85	4×Φ14
TR1357	245	2500	4730	60	125×130	4×Φ18	500	12×Φ24	1340	500	290	200	≤260	45	80×85	4×Φ14

KEY PARAMETERS COMPARISON

Comparison of RIF® performance with IEC Standard for Power factor, Mechanical Strength and Max temperature

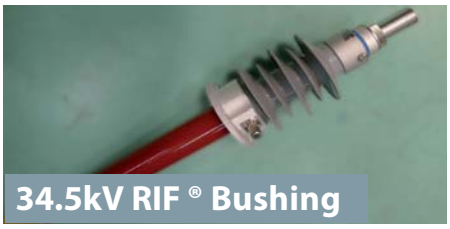
	RHM International's RIF®	IEC Specifications							
C1 Dielectric dissipation factor	≤0.4%	≤0.5%							
Maximum Temperature	130°C	105°C (OIP) 120°C (RBP and RIP)							
Cantilever test load N	Level II		Rated Continuous Current A							
		Highest voltage for equiptment Um kV	<800		1000 ~ 1600		2000 ~ 2500		>3150	
			I	II	I	II	I	II	I	II
		<36	1000	1000	1250	1250	2000	2000	3150	3150
		52	1000	1600	1250	1600	2000	2500	3150	3150
		72.5 to 100	1000	2000	1250	2000	2000	3150	4000	4000
		123 to 145	1250	3150	1600	3150	2500	4000	4000	4000
		170 to 245	1250	4000	1600	4000	2500	5000	4000	5000

Outline Drawing for RIF® Bushings (nominal system voltage 345 kV)



Rated Voltage (kV)	Rated Current (A)	Oil-end Length (L) mm	CT Space (W) mm	Oil-end Core Diameter (D) mm
345	800 (Draw lead)	1295	584	400
345	1200 (Solid rod)	1295	584	400
345	2000 (Solid rod)	1295	584	400
345	3000 (Solid rod)	1295	584	400

Controlled Environment
Manufacturing is conducted in controlled clean rooms.



High Quality Innovative Bushings

Ultra-reliable.
Ultra-safe.
Up to 345kV.

RIF®: the fully dry transformer bushing technology that leaves less room for error.

Inquiry Checklist

When placing an order, customer's specification should include:

- Highest voltage Um
- Rated current
- Rated frequency
- Outdoor insulator's minimum creepage distance
- Mounting flange configuration
- Reference Standard
- Environmental Conditions (altitude, pollution class)

For special requirements, custom designs are available.

CONTACT US

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