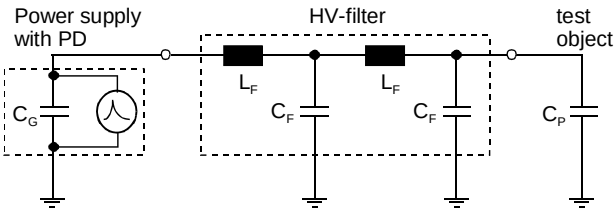
Data Sheet no. 1.36/8

HV Power Filters for Transformer Testing, Type HVF

Application

For PD measurements at power and distribution transformers with induced voltage the background noise level within the laboratory should be quite low (less than 5 pC). Even so, high-frequency (HF) radiation-bounded interferences and conducted interfering signals are caused by the power supply. Radiation-bounded interferences can be damped by screening the building or by the additional installation of a shielded cabin.
For the sufficient damping of conducted interfering signals caused by the power supply (e.g. noise signals from the power supply via the test transformer) the use of an optimally designed HV filter between power supply and test object is required (Fig. 1). In the simplest case such a filter consists of an AC capacitor which is connected to a blocking impedance (Fig. 2).
In general, an optimum coordination of the filter components L_F and C_F (Fig. 1) is required to avoid resonance excitations within the filter and for obtaining a maximum blocking function. This task takes HIGHVOLT as a system supplier of such components.



C_G – equivalent capacity of the power supply (e. g. generator set)
L_F – filter inductance
C_F – filter capacitor / PD coupling capacitor
C_P – capacitance of the test object (e. g. LV winding of power transformer)

Fig. 1: Single-phase equivalent circuit diagram for the induced AC voltage test of power transformers

Extension possibilities

Conducted interfering signals caused by the power supply are often damped only insufficiently by using a single-stage filter. The damping of these interfering signals can be improved if single-stage filters are enlarged by an additional stage to two-stage filters (Fig. 1 and 3). In most test cases their damping is completely sufficient. Only for special test cases an even stronger damping of the interfering signals is required. That can be realized by using of three-stage filters, available on special customer's request.
HIGHVOLT offers an assortment of standard types for single- and double-stage HV filters. The technical data of these single-phase filters are contained in the following table. The number of required filter components for the multi-phase variant increases linearly with the number of given phases for the corresponding test case.
For special system arrangements a very compact model (Fig. 4) for vertical and stationary erection inside a test container is needed (see Data Sheet 8.71).

Type designation HVF a-b/c V

a - rated voltage U_r in kV
b - rated current I_r (continuous operation) in A
c - number of filter stages
V - special stationary erection in vertical design

Example: HVF 100-40/1 (U_r = 100 kV, I_r = 40 A, single-stage filter)

Technical data: Single-phase filter, use in air

filter type	voltage range [kV]	rated current [A]	No. of filter stages	L_F*) [mH]	C_F*) [nF]	attenuation @ f > 30 kHz [dB]	max. power frequency [Hz]	length l [mm]	width w [mm]	height h [mm]	total weight [kg]
HVF 50-40/1	0…50	40	1	17	10	> 14	300	1300	500	1000	109
HVF 50-40/2	0…50	40	2	17	10	> 28	300	2400	500	1000	184
HVF 50-60/1	0…50	60	1	4	10	> 5	300	1700	500	800	110
HVF 50-60/2	0…50	60	2	4	10	> 8	300	3200	500	800	186
HVF 50-100/1	0…50	100	1	6	10	> 9	170	2500	500	900	193
HVF 50-100/2	0…50	100	2	6	10	> 18	170	4800	500	900	352
HVF 100-40/1	50…100	40	1	17	14	> 17	300	1500	1000	1650	164
HVF 100-40/2	50…100	40	2	17	14	> 34	300	2700	1000	1650	294
HVF 100-60/1	50…100	60	1	4	14	> 8	300	1900	1000	1400	165
HVF 100-60/2	50…100	60	2	4	14	> 16	300	3500	1000	1400	296
HVF 100-100/1	50…100	100	1	6	14	> 12	170	2700	1000	1550	248
HVF 100-100/2	50…100	100	2	6	14	> 24	170	5100	1000	1550	462
HVF 150-40/1	100…150	40	1	17	14	> 17	300	1500	1000	1650	164
HVF 150-40/2	100…150	40	2	17	14	> 34	300	2700	1000	1650	294
HVF 150-60/1	100…150	60	1	4	14	> 8	300	1900	1000	1400	165
HVF 150-60/2	100…150	60	2	4	14	> 16	300	3500	1000	1400	296
HVF 150-100/1	100…150	100	1	6	14	> 12	170	2700	1000	1550	248
HVF 150-100/2	100…150	100	2	6	14	> 24	170	5100	1000	1550	462
HVF 200-40/1	150…200	40	1	17	10	> 14	300	1500	1000	2350	200
HVF 200-40/2	150…200	40	2	17	10	> 28	300	2700	1000	2350	366
HVF 200-60/1	150…200	60	1	4	10	> 5	300	1900	1000	2150	201
HVF 200-60/2	150…200	60	2	4	10	> 8	300	3500	1000	2150	368
HVF 200-100/1	150…200	100	1	6	10	> 9	170	2700	1000	2300	284
HVF 200-100/2	150…200	100	2	6	10	> 18	170	5100	1000	2300	534
HVF 50-65/1 V	0…50	65	1	10	10	> 9	200	650	600	1850	120

***) value of each component**

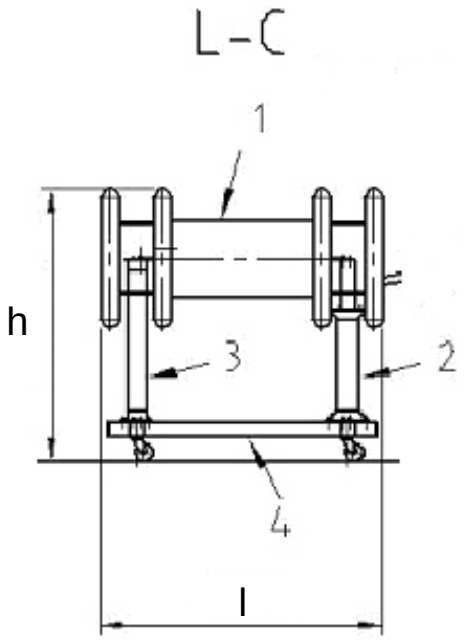


Fig. 2: Single-stage filter, type HVF 100-40/1

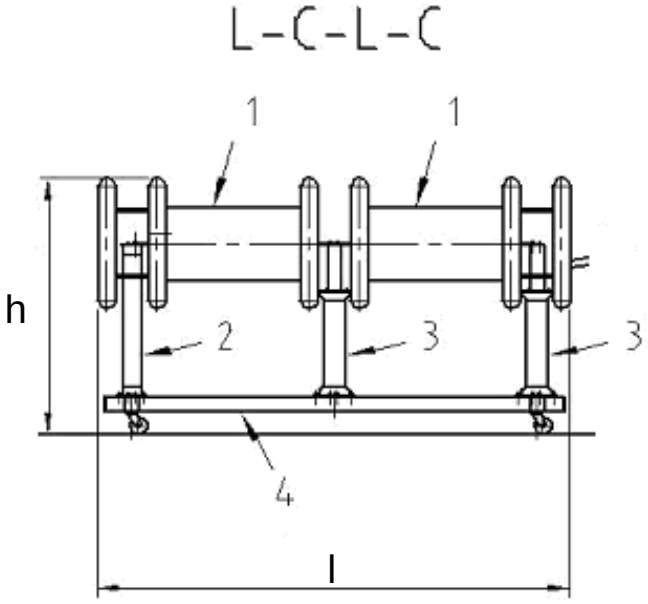


Fig. 3: Double-stage filter, type HVF 100-40/2

1 – inductance 2 – post insulator 3 – capacitor 4 – base frame (with rollers)

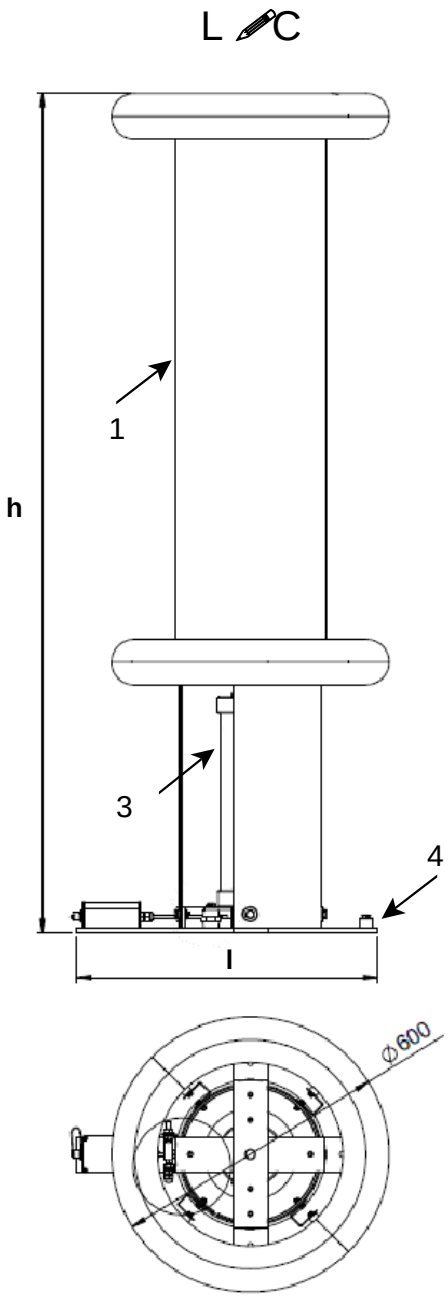


Fig. 4: Single-stage filter, type HVF 50-65/1 V

1 – inductance 3 – capacitor 4 – base frame (stationary)

For further information please contact: or our local representative:

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