

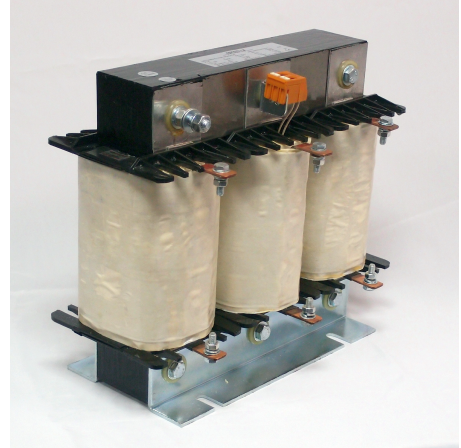


DETUNED FILTER REACTOR

(for use in PF correction capacitor bank)

Application

1. To create a 'detuned' natural frequency with power factor correction capacitor. This eliminate system resonance with harmonics which will damage the capacitor bank.
2. To reduce harmonics distortion and reduce the problems associated with this harmonics such as over heating of transformer and nuisance tripping.
3. Reduce switching transient inrush current of capacitors. This will reduce the circuit breaker failure and flickers in the power system.
4. The use of specific filtering factor requires careful system analysis.
As a general rule,
 - *p=7% is the ideal combination for max. capacitor protection, harmonics reduction at min. cost.*
 - *P=6% is used when increase reduction on 5th & 7th harmonics is required.*
 - *p=14% is used in 3rd harmonics rich system. Offer max. capacitor production.*



Features of Detuned Filter Reactor

1. Dry type, natural air cool type for indoor use. Ventilating fan is needed in enclosed cubical.
2. Iron core - constructed with low loss silicon steel.
3. Air gaps – multiple gaps. High linear performance of reactor with less gap losses and noise.
4. Aluminum wire and aluminum foil. For current above 60A. Alu foil is usually used.
 - Alu wire and foil have been used as transformer conductor for more than 30 years.
 - Alu foils also have higher ability to withstand short-circuit and transient switching current.
5. Nomex® or equivalent insulation paper is used for layer insulation.
6. Terminal – copper bar connection for current above 20A. JIS type terminals for lower current.
7. Complete with over temperature, bi-metal 145°C, normally closed thermostat.

Specification of Detuned Filter Reactor

1. Harmonic current handling capacity, as per chart below.

Rated Reactor Current	P = 7 %	P = 6 %	P = 14 %
I ₁ (rated, fundamental)	1.06x I _c	1.06x I _c	1.06x I _c
I ₃ (3 rd harmonics)	0.11x I ₁	0.09x I ₁	0.25x I ₁
I ₅ (5 rd harmonics)	0.25x I ₁	0.35x I ₁	0.08x I ₁
I ₇ (7 rd harmonics)	0.08x I ₁	0.10x I ₁	0.03x I ₁
I _{th} (Max. thermal)	1.12x I ₁	1.18x I ₁	1.12x I ₁
Linearity (-10% drop)	1.75x I ₁	2.1x I ₁	1.60x I ₁

- ** *Will operate satisfactory in power system with voltage harmonics (THDU) up to 5%.*
- ** *Special design reactor is required for system with THDU greater than 5%.*

2. **Inductance tolerance** is manufactured and calibrated to be within ±3%. 100% inspection.
3. **Coil-Coil, turn-turn insulation strength** 100% tested by Surge Comparison testing at 3.0KV
4. Design: **IEC 60076-6:2007.**

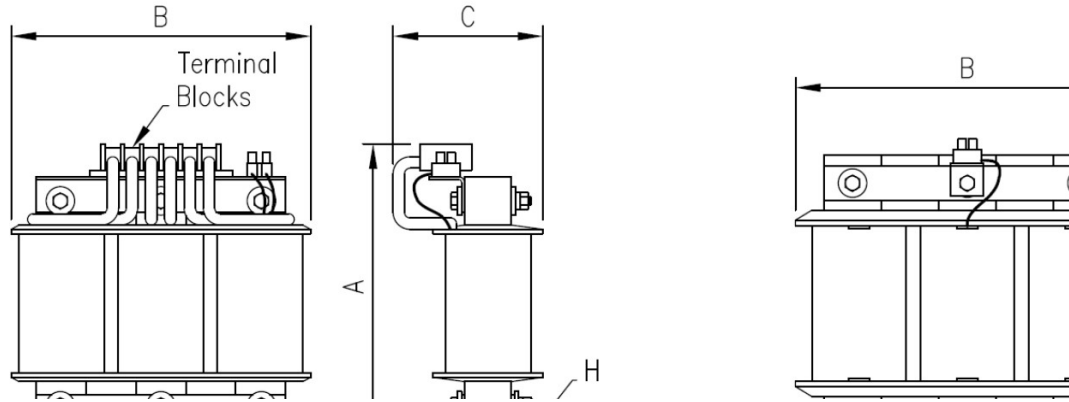
5. **Insulation class** - Class H, 180°C.
6. **Insulation varnish** - UL comply, epoxy base varnish. Vacuum impregnated, oven cured.
7. **Insulation**: 100% insulation strength tested at 3.0kV 60s.
8. **Operating temperature**: 120°C temperature rise at max. ambient temperature of 40°C.
9. **Noise level**: below 65db. - reactor will not hum at rated current.

*** If THDU exceeded 5%, specially produced P=8% detuned reactor maybe used.

*** If THDU exceeded 10%, P=14% detuned reactor should be used.

*** Other specification available upon request.

Dimension of Detuned Filter Reactor



Capacitor	I_{th}	$P =$	$P_w (I_c)$	A	B	C	D	E	H-holes	Wt		P/No:
Qcr kVAr	Amp	%	Watt	mm	mm	mm	mm	mm	mm	kg	type	Model
For p= 7% reactor, with 440V 50Hz capacitor at 400V 50Hz (China, Indonesia, Thailand & Vietnam)												
10	15.4	7%	45	205	210	115	75	116	10	9	A	AFR-0307009V400
20	30.8	7%	70	195	210	140	87	116	10	15	B	AFR-0307018V400
25	38.5	7%	80	220	240	150	96	136	10	17	B	AFR-0307022V400
30	46.2	7%	90	220	240	155	100	136	10	20	B	AFR-0307027V400
40	61.7	7%	110	220	240	170	114	136	10	24	B	AFR-0307036V400
50	77.1	7%	125	220	240	175	122	136	10	26	B	AFR-0307044V400
60	92.5	7%	155	270	305	170	122	170	10	37	B	AFR-0307053V400
80	123.3	7%	170	280	350	185	168	300	16	42	B	AFR-0307071V400
100	154.1	7%	190	280	350	195	180	300	16	45	B	AFR-0307089V400

For p= 7% reactor, with 525V 50Hz capacitor at 400V 50Hz only (China, Indonesia, Thailand & Vietnam)

10	10.8	7%	45	225	210	130	67	116	10	9	A	AFR-0307010V525
15	16.2	7%	55	200	210	115	74	116	10	11	A	AFR-0307015V525
20	21.7	7%	65	195	210	135	78	116	10	11.5	B	AFR-0307020V525
25	25.9	7%	70	195	210	140	88	116	10	15	B	AFR-0307025V525
30	32.5	7%	80	220	240	145	94	136	10	17	B	AFR-0307030V525
40	43.3	7%	90	220	240	150	97	136	10	20	B	AFR-0307040V525
50	54.1	7%	110	220	240	165	110	136	10	23	B	AFR-0307050V525
60	65.0	7%	125	220	240	180	124	136	10	25	B	AFR-0307060V525
80	86.6	7%	155	270	305	170	122	170	10	36	B	AFR-0307080V525
100	108.3	7%	170	270	305	175	130	170	10	41	B	AFR-0307100V525
120	130.0	7%	190	265	352	270	160	300	16	44	B	AFR-0307120V525
160	173.2	7%	220	280	355	200	182	300	16	54	B	AFR-0307160V525

For p= 7% reactor, with 230V 50Hz capacitor at 200 - 210V 50Hz only.												
10	29.6	7%	45	205	210	110	75	116	10	9	B	AFR-0307009V200
15	44.4	7%	65	180	235	138	74	116	10	11.5	B	AFR-0307013V200
20	59.2	7%	70	195	210	145	88	116	10	15	B	AFR-0307018V200
25	74.0	7%	80	220	240	150	94	136	10	17	B	AFR-0307022V200
30	26.9	7%	90	220	240	155	98	136	10	20	B	AFR-0307027V200
40	118.5	7%	110	230	285	170	126	170	10	24	B	AFR-0307036V200
50	148.1	7%	125	210	295	160	133	170	10	26	B	AFR-0307045V200
60	177.7	7%	155	265	352	245	130	170	10	37	B	AFR-0307054V200
75	221.1	7%	165	265	352	245	135	170	10	40	B	AFR-0307067V200
80	236.9	7%	170	255	352	255	140	300	16	42	B	AFR-0307072V200
100	296.1	7%	190	255	352	270	160	300	16	45	B	AFR-0307090V200

* Dimension subject to change without prior notice.

** Unspecified size will be make available upon request.

** P=6% & 14%. available upon request.