



Harmonic Filter Reactors

Type FKD / FDR



// Features that matter:

- Low losses
- Complete with mounting brackets and connecting cables
- Including temperature switches
- Temperature range up to +60 °C

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Description

Application

Used in conjunction with LKT type Power Factor Correction Capacitors, harmonic filter reactors (blocking reactors) make it possible to install detuned versions of fixed capacitor banks and power factor correction systems. This enables users installing distribution boards to construct customized systems themselves.

Design

Low-loss, three-phase assembly complete with mounting brackets, connecting cables and thermal trip.

Series Resonance Frequency

Version	Series resonance frequency	Detuning factor	For networks with utility company AF remote control ¹⁾
P1	136 Hz	$p=13.5\%$	> 166 Hz
P7	189 Hz	$p=7\%$	> 228 Hz

¹⁾Utility company specifications inconsistent with the above must be taken into account.

Please refer also to the design notes given in our Manual of Power Factor Correction. (other series resonance frequencies on request)

Mounting

The reactor must be mounted in a suitable enclosure ensuring an ambient temperature within the specified range.

Connections

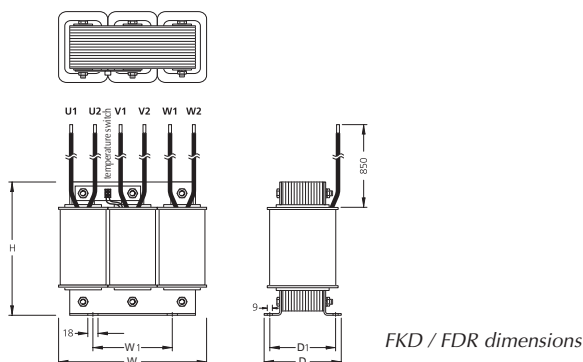
The coil line-side (U1, V1, W1) and load-side (U2, V2, W2) cables can be connected to the switchgear directly or via terminals. The temperature switch (contacts open at 140 °C) must be connected to a trip/alarm circuit in the control system.

Applicable Standards

When installing and connecting power capacitors in Germany, the standards VDE 0100 IEC 60364, VDE 0105 IEC 60050, IEC 60529, VDE 0560 part 46 IEC 60831 and VDE 0106 part 100 must be complied with. In other countries the equivalent local regulations must be observed.

Load Capacity

Version	Power loss W/kvar	Permissible harmonic voltage 250 Hz	350 Hz
P1	4-6	6%	6%
P7	3.5-6	6%	6%



FKD / FDR dimensions

Power Loss

3.5 – 6 W/kvar (depending on version and level of harmonics)

Temperature Range

-10 to +60 °C

Ingress Protection

IP00 to IEC 60529 for mounting within an enclosure

Important Note

Please use only the correct number of the appropriate power capacitors as stated in the table for each individual harmonic filter reactor. If this requirement is not adhered to, the resulting series resonance frequency can under certain circumstances move into a critical range. Apart from possibly overloading the installed components, the utility company's remote control systems could also be adversely affected.

Technical Data

Specimen order 1

P.F. correction stage with 7 % detuning factor

25 kvar at 400 V / 50 Hz supply voltage

2 power capacitors

Type **LKT 11.7 – 400 – DL** Art.-No. **31-10604**

2 terminal blocks

Type **AKD 25/3** Art.-No. **31-08000**

1 low-loss harmonic filter reactor with temperature switch

Type **FKD 25 – 400 – P7** Art.-No. **88-01768**

Specimen order 2

P.F. correction stage with 13.5 % detuning factor

12.5 kvar at 400 V / 50 Hz supply voltage

1 power capacitor

Type **LKT 15.5 – 480 – DP** Art.-No. **31-10513**

1 terminal block

Type **AKD 25/3** Art.-No. **31-08000**

1 low-loss harmonic filter reactor with temperature switch

Type **FKD 12.5 – 400 – P1** Art.-No. **88-01168**

Specimen order 3

P.F. correction stage with 13.5 % detuning factor

20 kvar at 400 V / 50 Hz supply voltage

1 power capacitor

Type **LKT 7.6 – 440 – DL** Art.-No. **31-10608**

1 power capacitor

Type **LKT 15.5 – 480 – DP** Art.-No. **31-10513**

2 terminal blocks

Type **AKD 25/3** Art.-No. **31-08000**

1 low-loss harmonic filter reactor with temperature switch

Type **FKD 15 – 400 – P1** Art.-No. **88-01038**

Harmonic Filter Reactors

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Capacitors and Harmonic Filter Reactors for 230 V / 50 Hz – mains network

Resonance frequency		fres: 189 Hz, detuning factor p: 7%													
Rated power of Capacitor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors					Dimensions in mm			Weight	Harmonic Filter Reactors				
		LKT 10.0-400-DP Art.-No. 31-10501	LKT 12.5-400-DP Art.-No. 31-10502	LKT 10.0-440-DP Art.-No. 31-10508	LKT 10.0-525-DP Art.-No. 31-10517	1	W	W1	H		D	D1	Art.-No.	Type	
5.0	12.6					1		150	80	132	109	75.5	5	88-01980	FDR 5-230-P7
10.0	26.9	3						178	100	156	95	66	9	88-01575	FKD 10-230-P7
12.5	31.3	1	2					178	100	156	115.5	85.5	9	88-01974	FDR 12.5-230-P7
16.7	44.9		4					178	100	156	128	98	10	88-01583	FKD 16.7-230-P7
20.0	53.8	1	4					202	100	177	121	91	15	88-01576	FKD 20-230-P7
25.0	62.5	2	4					202	100	177	121	91	16	88-01943	FDR 25-230-P7
33.0	89.9		8					226	100	197	128	98	21	88-01568	FKD 33-230-P7

Capacitors and Harmonic Filter Reactors for 230 V / 60 Hz – mains network

Resonance frequency		fres: 227 Hz, detuning factor p: 7%													
Rated power of Capacitor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors					Dimensions in mm			Weight	Harmonic Filter Reactors				
		LKT 10.0-400-DP Art.-No. 31-10501	LKT 7.1-300-DP Art.-No. 31-10523				W	W1	H		D	D1	Art.-No.	Type	
17.0	43.1	4						178	100	156	115	86	10	88-01809	FKD 17-230-60Hz-P7
25.0	62.2	2	3					202	100	177	121	91	21	88-01892	FDR 25-230-60Hz-P7

Harmonic Filter Reactors

Type FKD / FDR



Capacitors and Harmonic Filter Reactors for 400 V / 50 Hz – mains network

Resonance frequency														
fres: 189 Hz, detuning factor p: 7%														
Rated power of Capacitor Reactor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors				Dimensions in mm			Weight		Harmonic Filter Reactors			
		LKT 7,6-440-DL Art.-No. 31-10608	LKT 9,1-440-DL Art.-No. 31-10609	LKT 12,5-440-DP Art.-No. 31-10507	LKT 11,7-400-DL Art.-No. 31-10604	LKT 15,0-440-DP Art.-No. 31-10506	W	H	D	D1	kg	Art.-No.	Type	
6.25	9.0	1					150	80	130	109	75.5	7	88-01410	FKD 6.25-400-P7
7.5	10.8		1				150	80	130	109	75.5	7	88-01482	FKD 7.5-400-P7
10.0	14.4			1			178	100	156	115.5	85.5	10	88-01479	FKD 10-400-P7
12.5	18.0				1		178	100	156	115.5	85.5	10	88-01767	FDR 12.5-400-P7
15.0	21.6		2				202	100	177	121	91	15	88-01362	FKD 15-400-P7
20.0	29.0			2			226	100	198	104	74	19	88-01363	FKD 20-400-P7
25.0	36.0				2		202	100	177	121	91	21	88-01768	FDR 25-400-P7
30.0	43.0			3			261	140	229	110	80	21	88-01484	FKD 30-400-P7
40.0	58.0					3	261	140	228	110	80	21	88-01782	FDR 40-400-P7
50.0	72.0					4	261	140	235	136	106	27	88-01769	FDR 50-400-P7

Resonance frequency														
fres: 136 Hz, detuning factor p: 13.5%														
Rated power of Capacitor Reactor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors				Dimensions in mm			Weight		Harmonic Filter Reactors			
		LKT 7,8-480-DL Art.-No. 31-10616	LKT 7,7-525-DL Art.-No. 31-10621	LKT 7,6-440-DL Art.-No. 31-10608	LKT 15,5-480-DP Art.-No. 31-10513	LKT 12,1-440-DL Art.-No. 31-10610	LKT 9,1-440-DL Art.-No. 31-10609	W	H	D	D1	kg	Art.-No.	Type
6.25	9.0	1					178	100	156	115	86	10	88-01505	FKD 6.25-400-P1
10.0	14.4		2				178	100	156	115	86	10	88-01695	FKD 10-400-P1
12.5	18.0			1			202	100	177	121	91	15	88-01168	FKD 12.5-400-P1
20.0	28.8			1			226	100	197	128	98	21	88-01038	FKD 20-400-P1
25.0	36.0				2		261	140	230	136	106	27	88-01171	FKD 25-400-P1
40.0	57.6					2	295	225	265	155	135	33	88-01779	FDR 40-400-P1
50.0	72.0					4	295	225	265	155	125	33	88-01780	FDR 50-400-P1

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Capacitors and Harmonic Filter Reactors for 415 V / 50 Hz – mains network

Resonance frequency		f _{res} : 189 Hz, detuning factor p: 7%		Type and Quantity of the required capacitors		Dimensions in mm			Weight	Harmonic Filter Reactors	
Rated power of Capacitor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	LKT 15,5-480-DP Art.-No. 31-10513	LKT 12,5-525-DP Art.-No. 31-10516	W	H	D	D1	kg	Art.-No.	Type	
12.5	17.3	1		178	100	156	115	86	10	88-01937	FDR 12.5-415-P7
16.8	23.4		2	178	100	156	115	86	11	88-01977	FDR 16.8-415-P7
25.0	34.7	2		202	100	177	121	91	15	88-01938	FDR 25-415-P7
33.6	46.7		4	226	100	197	128	98	19	88-01978	FDR 33.6-415-P7
50.0	69.3	4		261	140	235	136	106	27	88-01930	FDR 50-415-P7

Capacitors and Harmonic Filter Reactors for 440 V / 50 Hz – mains network

Resonance frequency		f _{res} : 189 Hz, detuning factor p: 7%		Type and Quantity of the required capacitors		Dimensions in mm			Weight	Harmonic Filter Reactors	
Rated power of Capacitor combination Q _c [kvar]	Rated current of Capacitor Reactor combination In [A]	LKT 12,1-440-DL Art.-No. 31-10610		W	H	D	D1	kg	Art.-No.	Type	
25.0	34.2	2		226	100	197	128	98	21	88-01008	FKD 25-440-P7
50.0	68.4	4		261	140	235	110	80	28	88-01124	FKD 50-440-P7

Harmonic Filter Reactors

Type FKD / FDR



Capacitors and Harmonic Filter Reactors for 440 V / 60 Hz – mains network

Resonance frequency		fres: 227 Hz, detuning factor p: 7%													
Rated power of Capacitor combination Q _{ic} [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors					Dimensions in mm					Weight	Harmonic Filter Reactors		
		LKT 8,33-525-DL Art.-No. 31-10622	LKT 15,5-480-DP Art.-No. 31-10513	LKT 12,1-440-DL Art.-No. 31-10610	LKT 7,7-525-DL Art.-No. 31-10621	LKT 5,9-525-DL Art.-No. 31-10620	LKT 7,8-480-DL Art.-No. 31-10616	W	W1	H	D			D1	kg
6.25	9.2				1			150	80	132	109	75.5	6	88-01914	FKD 6.25-440-60Hz-P7
7.5	9.9	1						150	80	132	109	75.5	6	88-01795	FKD 7.5-440-60Hz-P7
12.5	16.9	1			1			178	100	156	95	66	21	88-01883	FKD 12.5-440-60Hz-P7
15.0	19.8			1				178	100	156	115.5	85.5	10	88-01796	FKD 15-440-60Hz-P7
25.0	33.1		1			1		202	100	177	121	91	11	88-01884	FKD 25-440-60Hz-P7
50.0	66.2		3					261	140	235	110	80	29	88-01875	FDR 50-440-60Hz-P7

Capacitors and Harmonic Filter Reactors for 460 V / 60 Hz – mains network

Resonance frequency		fres: 189 Hz, detuning factor p: 7%													
Rated power of Capacitor combination Q _{ic} [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors					Dimensions in mm					Weight	Harmonic Filter Reactors		
		LKT 12,5-525-DP Art.-No. 31-10516					W	W1	H	D	D1			kg	Art.-No.
12.5	15.5	1						178	100	156	115.5	85.5	10	88-01854	FDR 12.5-460-60Hz-P7
25.0	31.1	2						202	100	177	121	91	21	88-01855	FDR 25-460-60Hz-P7
50.0	62.1	4						261	140	235	136	106	27	88-01856	FDR 50-460-60Hz-P7

Harmonic Filter Reactors

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Capacitors and Harmonic Filter Reactors for 480 V / 60 Hz – mains network

Resonance frequency		fres: 227 Hz, detuning factor p: 7%		Type and Quantity of the required capacitors		Dimensions in mm			Weight	Harmonic Filter Reactors			
Rated power of Capacitor combination [kvar]	Rated current of Capacitor Reactor combination In [A]	LKT 12.5-525-DP Art.-No.	LKT 7.7-525-DL Art.-No.	LKT 4.17-525-DL Art.-No.	LKT 8.33-525-DL Art.-No.	W	W1	H	D	D1	kg	Art.-No.	Type
33.3	43.1	2			1	261	140	229	110	80	21	88-01736	FKD 33.3-480-60Hz-P7
41.6	53.9	3		1		261	140	229	110	80	21	88-01737	FKD 41.6-480-60Hz-P7
50.0	60.5		6			261	140	235	136	106	27	88-01858	FDR 50-480-60Hz-P7

Capacitors and Harmonic Filter Reactors for 525 V / 50 Hz – mains network

Resonance frequency		fres: 189 Hz, detuning factor p: 7%		Type and Quantity of the required capacitors		Dimensions in mm			Weight	Harmonic Filter Reactors			
Rated power of Capacitor combination [kvar]	Rated current of Capacitor Reactor combination In [A]	LKT 4.17-525-DL Art.-No.	LKT 5.9-525-DL Art.-No.	LKT 7.7-525-DL Art.-No.	LKT 8.33-525-DL Art.-No.	W	W1	H	D	D1	kg	Art.-No.	Type
6.25	7.0		1			150	80	130	109	75.5	7	88-01801	FKD 6.25-525-P7
12.5	14.1		2			178	100	156	115.5	85.5	10	88-01802	FKD 12.5-525-P7
20.0	24.7	1			2	226	100	198	104	74	19	88-01080	FKD 20-525-P7
25.0	29.6		3			226	100	197	128	98	21	88-01838	FDR 25-525-P7
30.0	34.6	1			3	226	100	197	128	98	21	88-01533	FKD 30-525-P7
50.0	55.0		6			261	140	235	136	106	29	88-01872	FDR 50-525-P7

Resonance frequency fres: 136 Hz, detuning factor p: 13.5%

Resonance frequency		fres: 136 Hz, detuning factor p: 13.5%		Type and Quantity of the required capacitors		Dimensions in mm			Weight	Harmonic Filter Reactors			
Rated power of Capacitor combination [kvar]	Rated current of Capacitor Reactor combination In [A]	LKT 4.17-525-DL Art.-No.	LKT 5.9-525-DL Art.-No.	LKT 8.33-525-DL Art.-No.	LKT 12.5-525-DL Art.-No.	W	W1	H	D	D1	kg	Art.-No.	Type
36.0	27.9	1	3			261	140	230	136	106	25	88-01960	FDR 25-525-P1
50.0	55.8	2	6			295	225	265	155	125	52	88-01900	FDR 50-525-P1

Harmonic Filter Reactors

Type FKD / FDR



Capacitors and Harmonic Filter Reactors for 690 V / 50 Hz – mains network

Resonance frequency		fres: 189 Hz, detuning factor p: 7 %									
Rated power of Capacitor Reactor combination Q _{LC} [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors		Dimensions in mm			Weight		Harmonic Filter Reactors		
		LKT 9,4-440-EP Art.-No. 31-10511		W	H	D	D1	kg	Art.-No.	Type	
25.0	22.6	3		202	100	177	121	91	19	88-01932	FDR 25-690-P7
50.0	45.2	6		261	140	235	136	106	27	88-01933	FDR 50-690-P7

Resonance frequency		fres: 136 Hz, detuning factor p: 13.5 %									
Rated power of Capacitor Reactor combination Q _{LC} [kvar]	Rated current of Capacitor Reactor combination In [A]	Type and Quantity of the required capacitors		Dimensions in mm			Weight		Harmonic Filter Reactors		
		LKT 4,8-480-EP Art.-No. 31-10515	LKT 6,0-480-EP Art.-No. 31-10514	LKT 8,3-525-EP Art.-No. 31-10518	W	H	D	D1	kg	Art.-No.	Type
25.0	21.7	3	3	261	140	230	136	106	27	88-01842	FKD 25-690-P1
50.0	43.4		9	295	225	265	155	125	33	88-01843	FKD 50-690-P1