

Power Factor Correction Systems

Power Factor Correction Systems – detuned



LSK-P

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- Power Range: 17.5 to 100 kvar
- Compact design in sheet steel cabinet for wall-mounting
- Ready for connection
- Fully automatic and intelligent Power Factor Control Relay
- Power Factor Correction Capacitors LKT dry-type with triple safety feature

// Application Recommendations

Power Factor Correction Systems type LSK-P are a perfect solution for small and medium-sized firms and buildings and also for power factor correction at sub-distribution boards.

They are suitable for supply networks with harmonic distortion according to EN 61000 class 2. They are available as follows:

Version	Detuning factor	Resonance frequency
P1	$p = 14 \%$	134 Hz
P7	$p = 7 \%$	189 Hz
P8	$p = 8 \%$	177 Hz

// Power Range

Power Factor Correction System in sheet steel cabinet:

- 17.5 to 100 kvar

// Construction

The ready-for-connection Power Factor Correction System consists of a pre-assembled mounting plate, type LSP-P and the suitable sheet steel cabinet.

The LSK-P contains:

- Self-healing LKT type power capacitors with low-loss self-healing dielectric made from segmented metallised polypropylene film. Filled with a PCB-free filler. With discharge resistors, as per EN 60831-1 and -2 as well as IEC 60831-1 and -2
- Heavy duty Capacitor Switching Contactors
- Harmonic Filter Reactors with overtemperature switch
- Fuse links, 3-pole, size NH00
- Control terminal strip with control fuse and thermal trip contact for safety shutdown
- Intelligent Power Factor Control Relay RM 9606

// Installation Site

The place of installation must comply with the requirements of the ingress protection and ambient temperature concerned.

// Regulations

For installation and connection of Power Factor Correction Capacitors in Germany the following regulations must be complied with: VDE 0100, VDE 0105, VDE 0560 Part 46 and VDE 0106 Part 100 (German Association of Electrical Engineers). In other countries the equivalent local regulations must be followed.

// Connection

The power cable and the CT cable enter the bottom of the cabinet through cable glands or rubber sleeves. The power cable is connected directly to the NH fuse base, the cable from the current transformer to the terminal strip.

// System Expansion

An extension of the system is possible by adding LSKZ-P extension units. This extension unit will be integrated in the existing control circuit via the control cable (supplied with the extension unit).

// Technical Data

Design	Sheet steel wall cabinet with door right hinged
Rated voltage	400 V/50 Hz
Rated voltage of capacitors	440 V/50 Hz
Ambient temperature	-5 °C to +35 °C
Humidity	Max. 90 %, no condensation
Cabinet colour	RAL 7035
Standards	EN 60831-1 and -2 IEC 60831-1 and -2 EN 61921 VDE 0660 Part 600-1 and -2 EN 61439-1 and -2

// Important Notes

For further information on power factor correction and harmonics please refer to our „Manual of Power Factor Corrections“.

FRAKO systems are designed for connecting 5 core cables. If a 4-core cable is used, a jumper must be fitted to connect PE and N, or a control transformer must be installed.

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Version: P1 (Detuning factor $p = 14\%$)

Article-No.	Type	Rated power [kvar]	Stage power [kvar]	Switching sequence	Dimensions			Weight approx. [kg]	Protection IP
					Width [mm]	Height [mm]	Depth [mm]		

Power Factor Correction Systems in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSK ...-3-P1

34-13978	LSK 21,88-3,13-111-400-3-606-P1	21.88	3.13	1:2:4	600	1211	311	97	20
34-13800	LSK 25-6,25-21-400-3-606-P1	25	6.25	1:1:2	600	1211	311	102	20
34-13896	LSK 31,25-6,25-12-400-3-606-P1	31.25	6.25	1:2:2	600	1211	311	105	20
34-13967	LSK 34,38-3,13-112-400-3-606-P1	34.38	3.13	1:2:4:4	600	1211	311	109	20
34-13885	LSK 43,75-6,25-111-400-3-606-P1	43.75	6.25	1:2:4	600	1211	311	119	20
34-14490	LSK 46,88-3,13-1111-400-3-606-P1	46.88	3.13	1:2:4:8	600	1211	311	125	20
34-13860	LSK 50-6,25-211-400-3-606-P1	50	6.25	1:1:2:4	600	1211	311	130	20
34-13882	LSK 50-12,5-21-400-3-606-P1	50	12.5	1:1:2	600	1211	311	125	20
34-13928	LSK 50-50-1-400-3-606-P1	50	50	1	600	1211	311	130	20
34-13934	LSK 62,5-12,5-12-400-3-606-P1	62.5	12.5	1:2:2	600	1211	311	138	20
34-13849	LSK 68,75-6,25-112-400-3-606-P1	68.75	6.25	1:2:4:4	600	1211	311	150	20
34-14499	LSK 75-12,5-11A-400-3-606-P1	75	12.5	1:2:3	600	1211	311	157	20
34-13870	LSK 75-12,5-22-400-3-606-P1	75	12.5	1:1:2:2	600	1211	311	153	20
34-13979	LSK 75-25-11-400-3-606-P1	75	25	1:2	600	1211	311	151	20
34-13851	LSK 87,5-12,5-111-400-3-606-P1	87.5	12.5	1:2:4	600	1211	311	159	20
34-13950	LSK 100-16,67-11A-400-3-606-P1	100	16.67	1:2:3	600	1211	311	170	20

Power Factor Correction Systems, extension units in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSKZ ...-3-P1

34-14121	LSKZ 50-50-1-400-3-P1	50	50	1	600	1211	311	119	20
34-14131	LSKZ 75-25-11-400-3-P1	75	25	1:2	600	1211	311	150	20

Other rated voltages, frequencies and power ratings on request

Recommended supply lead cross sections: please refer to the technical annex (page 145 ff.)

Version: P7 (Detuning factor $p = 7\%$)

Article-No.	Type	Rated power [kvar]	Stage power [kvar]	Switching sequence	Dimensions			Weight approx. [kg]	Protection IP
					Width [mm]	Height [mm]	Depth [mm]		

Power Factor Correction Systems in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSK ...-3-P7

34-13852	LSK 17,5-2,5-111-400-3-606-P7	17.5	2.5	1:2:4	600	1211	311	85	20
34-13857	LSK 25-5-12-400-3-606-P7	25	5	1:2:2	600	1211	311	91	20
34-13975	LSK 25-6,25-21-400-3-606-P7	25	6.25	1:1:2	600	1211	311	87	20
34-13839	LSK 30-5-11A-400-3-606-P7	30	5	1:2:3	600	1211	311	94	20
34-13942	LSK 31,25-6,25-12-400-3-606-P7	31.25	6.25	1:2:2	600	1211	311	92	20
34-13832	LSK 43,75-6,25-111-400-3-606-P7	43.75	6.25	1:2:4	600	1211	311	97	20
34-14457	LSK 46,88-3,13-1111-400-3-606-P7	46.88	3.13	1:2:4:8	600	1211	311	102	20
34-13841	LSK 50-6,25-211-400-3-606-P7	50	6.25	1:1:2:4	600	1211	311	104	20
34-13861	LSK 50-12,5-21-400-3-606-P7	50	12.5	1:1:2	600	1211	311	100	20
34-13980	LSK 50-50-1-400-3-606-P7	50	50	1	600	1211	311	104	20
34-13850	LSK 52,5-7,5-111-400-3-606-P7	52.5	7.5	1:2:4	600	1211	311	107	20
34-13867	LSK 60-10-11A-400-3-606-P7	60	10	1:2:3	600	1211	311	111	20
34-13872	LSK 62,5-12,5-12-400-3-606-P7	62.5	12.5	1:2:2	600	1211	311	107	20
34-13831	LSK 68,75-6,25-112-400-3-606-P7	68.75	6.25	1:2:4:4	600	1211	311	117	20
34-14500	LSK 75-12,5-11A-400-3-606-P7	75	12.5	1:2:3	600	1211	311	117	20
34-13855	LSK 75-12,5-22-400-3-606-P7	75	12.5	1:1:2:2	600	1211	311	122	20
34-13981	LSK 75-25-11-400-3-606-P7	75	25	1:2	600	1211	311	112	20
34-13833	LSK 87,5-12,5-111-400-3-606-P7	87.5	12.5	1:2:4	600	1211	311	122	20
34-13863	LSK 93,75-6,25-1111-400-3-606-P7	93.75	6.25	1:2:4:8	600	1211	311	131	20
34-13835	LSK 100-12,5-211-400-3-606-P7	100	12.5	1:1:2:4	600	1211	311	134	20
34-13971	LSK 100-16,67-11A-400-3-606-P7	100	16.67	1:2:3	600	1211	311	135	20
34-13918	LSK 100-25-21-400-3-606-P7	100	25	1:1:2	600	1211	311	129	20

Power Factor Correction Systems, extension units in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSKZ ...-3-P7

34-14127	LSKZ 50-50-1-400-3-P7	50	50	1	600	1211	311	100	20
34-14128	LSKZ 60-30-2-400-3-P7	60	30	1:1	600	1211	311	109	20
34-14120	LSKZ 75-25-11-400-3-P7	75	25	1:2	600	1211	311	113	20
34-14129	LSKZ 90-30-3-400-3-P7	90	30	1:1:1	600	1211	311	115	20
34-14130	LSKZ 100-50-2-400-3-P7	100	50	1:1	600	1211	311	120	20

Other rated voltages, frequencies and power ratings on request

Recommended supply lead cross sections: please refer to the technical annex (page 145 ff.)

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Power Factor Correction Systems – detuned

Version: P8 (Detuning factor $p = 8\%$)

Article-No.	Type	Rated power [kvar]	Stage power [kvar]	Switching sequence	Dimensions			Weight approx. [kg]	Protection IP
					Width [mm]	Height [mm]	Depth [mm]		

Power Factor Correction Systems in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSK ...-3-P8

34-13875	LSK 17,5-2,5-111-400-3-606-P8	17.5	2.5	1:2:4	600	1211	311	84	20
34-13912	LSK 25-5-12-400-3-606-P8	25	5	1:2:2	600	1211	311	88	20
34-14433	LSK 25-6,25-21-400-3-606-P8	25	6.25	1:1:2	600	1211	311	87	20
34-13908	LSK 30-5-11A-400-3-606-P8	30	5	1:2:3	600	1211	311	96	20
34-13846	LSK 31,25-6,25-12-400-3-606-P8	31.25	6.25	1:2:2	600	1211	311	91	20
34-13880	LSK 43,75-6,25-111-400-3-606-P8	43.75	6.25	1:2:4	600	1211	311	98	20
34-13973	LSK 46,88-3,13-1111-400-3-606-P8	46.88	3.13	1:2:4:8	600	1211	311	102	20
34-13911	LSK 50-6,25-211-400-3-606-P8	50	6.25	1:1:2:4	600	1211	311	104	20
34-13986	LSK 50-12,5-21-400-3-606-P8	50	12.5	1:1:2	600	1211	311	101	20
34-14435	LSK 50-50-1-400-3-606-P8	50	50	1	600	1211	311	101	20
34-13988	LSK 52,5-7,5-111-400-3-606-P8	52.5	7.5	1:2:4	600	1211	311	108	20
34-13956	LSK 60-10-11A-400-3-606-P8	60	10	1:2:3	600	1211	311	112	20
34-13976	LSK 62,5-12,5-12-400-3-606-P8	62.5	12.5	1:2:2	600	1211	311	115	20
34-13845	LSK 68,75-6,25-112-400-3-606-P8	68.75	6.25	1:2:4:4	600	1211	311	115	20
34-14501	LSK 75-12,5-11A-400-3-606-P8	75	12.5	1:2:3	600	1211	311	122	20
34-13853	LSK 75-12,5-22-400-3-606-P8	75	12.5	1:1:2:2	600	1211	311	122	20
34-14436	LSK 75-25-11-400-3-606-P8	75	25	1:2	600	1211	311	124	20
34-13968	LSK 87,5-12,5-111-400-3-606-P8	87.5	12.5	1:2:4	600	1211	311	127	20
34-13932	LSK 93,75-6,25-1111-400-3-606-P8	93.75	6.25	1:2:4:8	600	1211	311	132	20
34-13854	LSK 100-12,5-211-400-3-606-P8	100	12.5	1:1:2:4	600	1211	311	134	20
34-13977	LSK 100-16,67-11A-400-3-606-P8	100	16.67	1:2:3	600	1211	311	135	20
34-14426	LSK 100-25-21-400-3-606-P8	100	25	1:1:2	600	1211	311	133	20

Power Factor Correction Systems, extension units in sheet steel wall cabinets, rated mains voltage: 400 V / 50 Hz

Type series: LSKZ ...-3-P8

34-14140	LSKZ 50-50-1-400-3-P8	50	50	1	600	1211	311	108	20
34-14141	LSKZ 60-30-2-400-3-P8	60	30	1:1	600	1211	311	119	20
34-14142	LSKZ 75-25-11-400-3-P8	75	25	1:2	600	1211	311	123	20
34-14143	LSKZ 90-30-3-400-3-P8	90	30	1:1:1	600	1211	311	126	20
34-14138	LSKZ 100-50-2-400-3-P8	100	50	1:1	600	1211	311	132	20

Other rated voltages, frequencies and power ratings on request

Recommended supply lead cross sections: please refer to the technical annex (page 145 ff.)

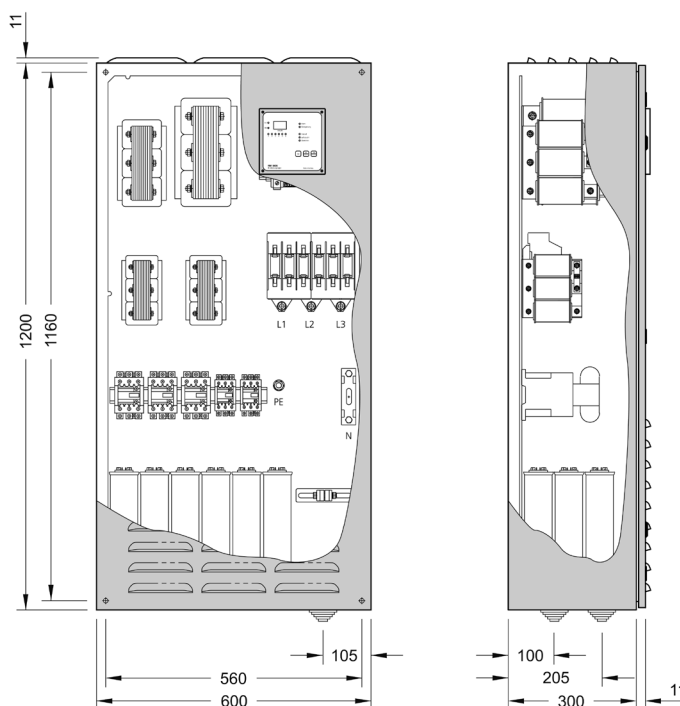
// Options and accessories for Power Factor Correction Systems type LSK-P 400V, 50 Hz

Article-No.	Type	Description
Options, mounted and wired ready for operation		
S34-5502	-111- (instead of -606)	Power Factor Control Relay EMR 1100S instead of RM 9606
S34-5500	-112- (instead of -606)	Power Factor Control Relay EMR 1100 instead of RM 9606
S34-5508	-Li	Cabinet door with door left hinged
S34-0060	-SO	Special painting outside (RAL-Scale)
S34-5032	-54	Ingress protection IP54
S34-5511	-SLT	With connection at the top instead of fuse base ≤ 60 kvar = 1 pc. > 60 kvar = 2 pcs
S34-0103	-LTA	Switch disconnecter* in cable entry compartment ≤ 60 kvar
S34-0104	-LTA	Switch disconnecter* in cable entry compartment > 60 kvar
S34-0105	-S56	Circuit breaker and control switch (On/Off) (option for Switzerland)
34-90011	-S19	Control phase + N via a protective motor switch (option for France)
S34-5537	-S119 (+ Power)	Control transformer set 315 VA incl. primary and secondary fuses
S34-5073	-SO(+ Description)	Voltage meter with switch
S34-0040	-S66	Summation current transformer 5+5/5A
S34-0081	-S66	Summation current transformer 5+5+5/5A
Accessories, loose		
34-80021	WB LSK-10	Wall distance assembly set 10 mm
34-80018	WB LSK-40	Wall distance assembly set 40 mm
34-80194	KR-LSK-3-200	Fixed base (Height = 200 mm; Depth = 300 mm)

*) Switch disconnecter can be operated from the outside

Other options and accessories on request

// Dimensions



Dimensional drawing LSK-P
(17.5 bis 100 kvar)

All dimensions in mm