

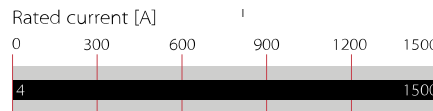
# 3-phase Line Reactor for Motor Drive & Power Quality Applications



- ▮ Provision of 4% impedance
- ▮ Reduction of mains harmonics
- ▮ Reduction of commutation notches
- ▮ Protection of motor drive electronics
- ▮ Limitation of inrush currents
- ▮ Improvement of true power factor



### Performance indicators



### Approvals



UL 508C up to 400 A. For use with AC or DC drives (power conversion equipment) only

### Features and benefits

- ▮ Ensure reliability, performance and a long service life of electrical consumers
- ▮ Reduction of mains harmonics and commutation notches
- ▮ Help to meet international power quality standards such as IEEE-519 or EN 61000-3-2
- ▮ Protection of motor drive electronics and dc link capacitors against mains transients
- ▮ Reduction of inrush and peak currents
- ▮ Reduction of conducted LF emission
- ▮ Improvement of conducted LF immunity
- ▮ Prevention from nuisance tripping caused by power line voltage spikes
- ▮ Improvement of true power factor

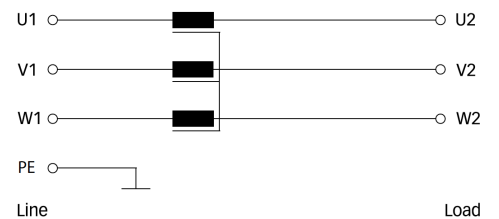
### Technical specifications

<b>Maximum continuous operating voltage</b>	3 x 500/288 VAC
<b>Design corresponding to</b>	EN 61558-2-20 (VDE 0570-2-20), UL 508C, CSA C22.2 NO.14
<b>Impedance</b>	4% @ 400 VAC, 50 Hz & rated current
<b>Typical harmonics reduction</b>	See table on next page
<b>High potential test voltage</b>	P → E 3000 VAC for 3 sec P → P 3000 VAC for 3 sec
<b>Insulation class</b>	T40/N (200°C) for ≤400 A types T40/F (155°C) for ≥500 A types T40/H (180°C) for 1500 A types
<b>Protection category</b>	IP 00 (KL types according to VBG 4)
<b>Rated currents</b>	4 to 1500 A @ 40°C
<b>Overload capability</b>	2 x rated current at switch on for 30 seconds 1.5 x rated current for 1 minute, once per hour
<b>Flammability corresponding to</b>	UL 94 V-2 or better
<b>Temperature range (operation and storage)</b>	-25°C to +100°C (25/100/21)
<b>MTBF @ 40°C/400 V (Mil-HB-217F)</b>	>500,000 hours

### Typical applications

- ▮ Motor drives and various adjustable speed drive systems, such as:
- ▮ Elevators
- ▮ Robots
- ▮ Machinery
- ▮ Process automation equipment

### Typical electrical schematic



## Reactor selection table

Reactor	Rated current	Typical drive	Nominal	Typical	Input/Output		Weight	Earthing bolt
	@ 40°C [A]	power rating* [kW]	inductance [mH]	power loss** [W]	connections		Total [kg]	
RWK 212-4-KL	4	1.5	7.3	23	KL		2.1	AMP 6,3 x 0,8
RWK 212-7-KL	7	3	4.2	36	KL		2.5	M4
RWK 212-11-KL	11	4	2.6	37	KL		2.5	M4
RWK 212-16-KL	16	7.5	1.8	59	KL		3.9	M5
RWK 212-21-KL	21	11	1.4	66	KL		5.4	M5
RWK 212-29-KL	29	15	1	69	KL		5.4	M5
RWK 212-35-KL	35	18.5	0.84	70	KL		5.9	M5
RWK 212-46-KL	46	22	0.64	99	KL		11	M6
RWK 212-60-KL	60	30	0.49	138	KL		15	M6
RWK 212-75-KL	75	37	0.39	133	KL		15	M6
RWK 212-95-KL	95	45	0.3	166	KL		22	M8
RWK 212-124-KS	124	55	0.23	172		KS	25	M8
RWK 212-156-KS	156	75	0.19	249		KS	25	M8
RWK 212-182-KS	182	90	0.16	245		KS	32	M10
RWK 212-230-KS	230	110/132	0.13	301		KS	35	M10
RWK 212-280-KS	280	160	0.1	335		KS	41	M10
RWK 212-330-KS	330	160	0.09	386		KS	56	M10
RWK 212-400-S	400	200	0.073	692		S	57	M10
RWK 212-500-S	500	250	0.058	761		S	67	M10
RWK 212-600-S	600	315	0.049	825		S	76	M10
RWK 212-680-S	680	355	0.043	876		S	80	M10
RWK 212-790-S	790	400	0.037	956		S	90	M10
RWK 212-910-S	910	450	0.032	1022		S	107	M10
RWK 212-1100-S	1100	630	0.026	1036		S	135	M10
RWK 212-1310-S	1310	725	0.023	1050		S	100	M10
RWK 212-1500-S	1500	830	0.020	1000		S	225	M10

Customized line reactors with different electrical and mechanical specifications are available on request.

\* Calculated at rated current, 400 VAC and  $\cos \phi=0.8$ . The exact value depends upon the efficiency of the drive, the motor and the entire application.

\*\* Power loss at 25°C/50 Hz, considering a typical harmonic spectrum of a motor drive with B6U rectifier bridge.

## Harmonics reduction

Line reactors are a cost-effective way for the limitation of mains harmonics. The harmonics reduction capability is related to the reactor impedance. A higher impedance translates directly into lower harmonic currents, but of course also into a larger component with a higher voltage drop – and vice versa.

4% impedance reactors like RWK 212 provide an excellent cost/benefit ratio and are particularly beneficiary in the most diverse motor drive applications.

The table below shows various reactor impedance values and their calculated effect in terms of harmonics reduction.

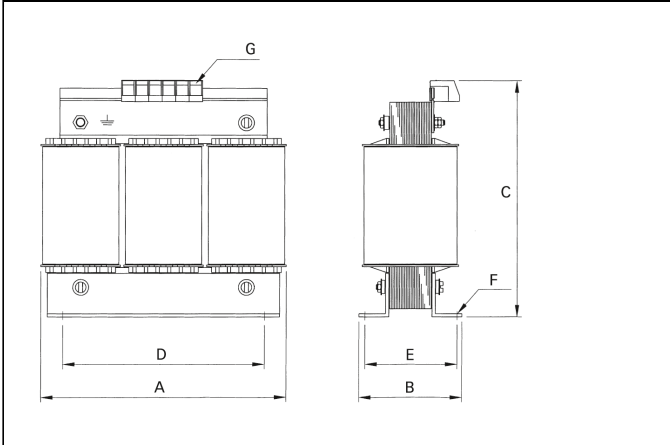
## Harmonic number/Input impedance (uk) vs. remaining harmonics [%]

	0.5%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5th	80	60	46	40	34	32	30	28	26	24	23
7th	60	37	22	16	13	12	11	10	9	8.3	7.5
11th	18	12	9	7.3	6.3	5.8	5.2	5	4.3	4.2	4
13th	10	7.5	5.8	4.9	4.2	3.9	3.6	3.3	3.15	3	2.8
17th	7.3	5.2	3.6	3	2.4	2.2	2.1	0.9	0.7	0.5	0.4
19th	6	4.2	2.8	2.2	2	0.8	0.7	0.4	0.3	0.25	0.2
%THID	102.5	72.2	52.3	44.13	37.31	34.96	32.65	30.35	28.04	25.92	24.68

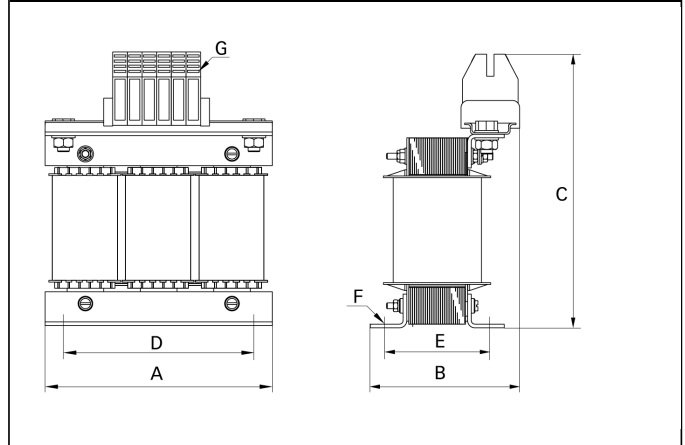
Reading example: a 4% impedance reactor typically reduces the THID to ~37% of the fundamental.

**Mechanical data**

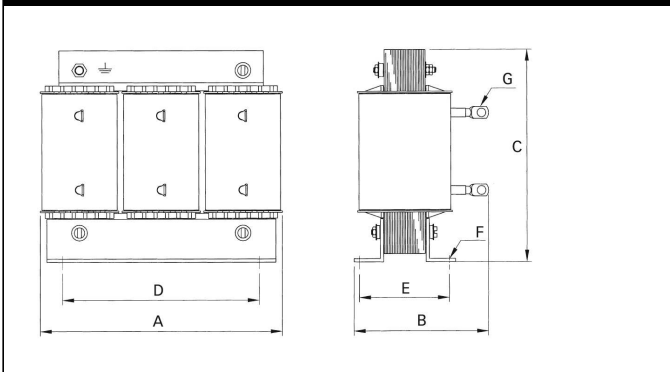
4 to 46 A types



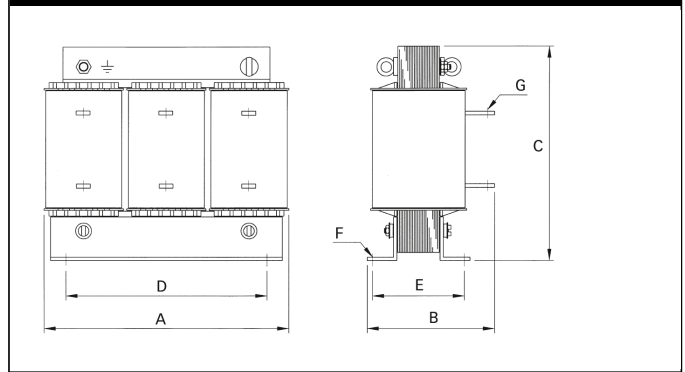
60 to 95 A types



124 to 330 A types



400 to 1500 A types



## Dimensions

	A	B	C	D	E	F	G
<b>4 A</b>	100	max. 70	max. 115	56	43	4.8 x 9	2.5 mm <sup>2</sup>
<b>7 and 11 A</b>	125	max. 80	max. 130	100	55	5 x 8	2.5 mm <sup>2</sup>
<b>16 A</b>	155	max. 80	max. 155	130	56.5	8 x 12	4 mm <sup>2</sup>
<b>21 A</b>	155	max. 95	max. 155	130	70.5	8 x 12	4 mm <sup>2</sup>
<b>29 A</b>	155	max. 95	max. 155	130	71.5	8 x 12	4 mm <sup>2</sup>
<b>35 A</b>	155	max. 105	max. 170	130	70	8 x 12	10 mm <sup>2</sup>
<b>46 A</b>	190	max. 120	max. 195	170	77.5	8 x 12	10 mm <sup>2</sup>
<b>60 A</b>	210	max. 155	max. 240	175	97	8 x 12	16 mm <sup>2</sup>
<b>75 A</b>	210	max. 160	max. 249	175	97	8 x 12	35 mm <sup>2</sup>
<b>95 A</b>	230	max. 185	max. 275	180	122	8 x 12	35 mm <sup>2</sup>
<b>124 and 156 A</b>	240	max. 210	max. 210	190	129	11 x 15	Ø10
<b>182 A</b>	265	max. 210	max. 230	215	114	11 x 15	Ø10
<b>230 A</b>	300	210	270	240	131	11 x 15	Ø12
<b>280 A</b>	300	218	270	240	139	11 x 15	Ø12
<b>330 A</b>	300	255	270	240	166	11 x 15	Ø12
<b>400 A</b>	420	205	390	370	133	11 x 15	Ø11
<b>500 A</b>	420	215	390	370	140	11 x 15	Ø14
<b>600 A</b>	420	225	390	370	149	11 x 15	Ø14
<b>680 A</b>	420	225	390	370	150	11 x 15	Ø14
<b>790 A</b>	420	240	390	370	162	11 x 15	Ø18
<b>910 A</b>	420	255	390	370	177	11 x 15	2 x Ø11
<b>1100 A</b>	420	290	390	370	200	11 x 15	2 x Ø11
<b>1310 A</b>	420	255	490	370	172	11 x 15	2 x Ø14
<b>1500 A</b>	551	400	613	490	266	13 x 18	4 x Ø13

All dimensions in mm; 1 inch = 25.4 mm  
Tolerances according: ISO 2768-m/EN 22768-m

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